

THE JOURNAL OF MEDICAL EDUCATION

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JUNE 1957 • VOLUME 32 • NUMBER 6

- The Teaching of Preventive Medicine
Around the World.....Carl E. Taylor**
- The Teaching of Psychology by Psychologists in
Medical School.....Matarazzo, Daniel**
- Students as Guinea Pigs.....Mogey and Watkinson**
- Medical Education in Germany.....W. Bargmann**
- An Automatic Examination Machine for Medical Students....Scott, Burke**
- American Medical Education from the
Revolutionary War to the Civil War.....Wm. Frederick Norwood**

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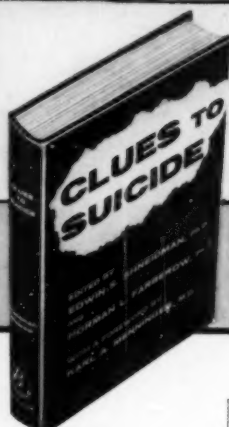
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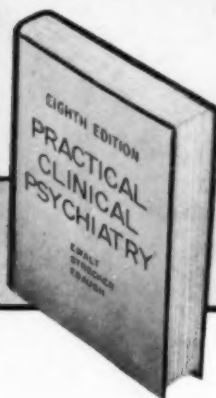
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II

The Journal of MEDICAL EDUCATION



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Journal of MEDICAL EDUCATION

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With Our Authors

Carl E. Taylor

The Teaching of Preventive Medicine Around the World. Dr. Taylor received his M.D., M.P.H. and Dr.P.H. at Harvard. He is now at the Harvard School of Public Health as director of the new Postgraduate Program in Preventive Medicine and Public Health described in this article. Until a year ago, he was professor of preventive medicine at the Christian Medical College, Ludhiana, Punjab, India, where a new program of teaching preventive medicine was developed.

Matarazzo, Daniel

The Teaching of Psychology by Psychologists in Medical Schools. Joseph D. Matarazzo, Ph.D., is professor of medical psychology at the University of Oregon Medical School and chairman of the Subcommittee on Psychology in Schools of Medicine, Education and Training Board, American Psychological Association. This Subcommittee was responsible for collecting the questionnaire data.

Robert S. Daniel, Ph.D., received his degree from Indiana University. He is professor of psychology at the University of Missouri. Four students in his graduate class in professional problems, Carol Farquharsen, Lynn Ourth, Kenneth Smoot and Gary Tilly, assisted in analyzing the results.

Scott, Burke

An Automatic Examination Machine for Medical Students. Dr. John C. Scott

is professor and head of the department of physiology, Hahnemann Medical College. He received his D.Sc. from Hahnemann in 1951. Norman B. Burke is a research assistant in the Cardiovascular Institute of Hahnemann. His training in electrical engineering was received at the Drexel Institute of Philadelphia and Rutgers University.

Mogey, Watkinson

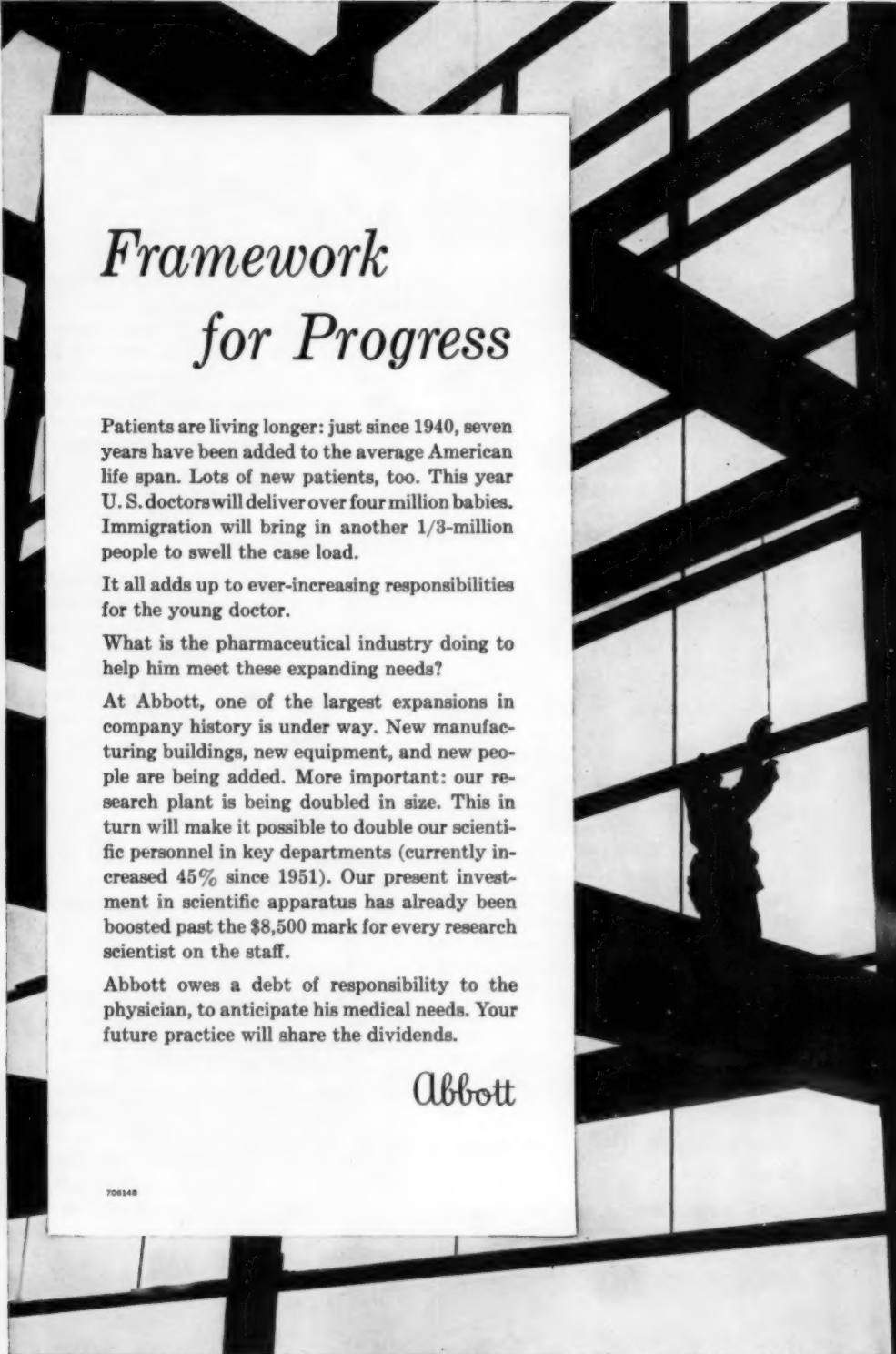
Students as Guinea Pigs. G. A. Mogey and G. Watkinson are members of the departments of pharmacology and medicine (respectively), the University of Leeds Medical School, Leeds, England. This article previously appeared in the *University of Leeds Medical Journal*, Vol. V, No. 2, 1956.

W. Bargmann

Medical Education in Germany. Dr. Bargmann is with the Anatomisches Institut der Universität Kiel, Kiel, Germany.

Wm. Frederick Norwood

American Medical Education from the Revolutionary War to the Civil War. Dr. Norwood is chairman of the division of legal and cultural medicine, College of Medical Evangelists. This article is part of the History of Medical Education series. Dr. Norwood received his Ph.D. from the University of Southern California.



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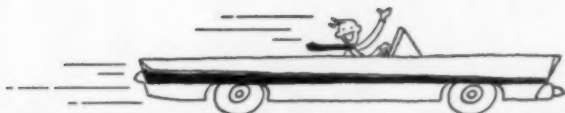
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68th Annual Meeting, October 21-23,
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American Medical Association—1957 Annual
meeting; June 3-7, New York.

International Congress on Dermatology—July
31-August 6; Stockholm, Sweden.

International Congress on Medicine and Sur-
gery—June 1-9, 1957, Turin, Italy.

Canadian Medical Association—June 17-21;
Edmonton, Alberta, Canada.

British Medical Association—July 15-19; New-
castle-upon-Tyne, England.

International Gerontological Congress—July
14-19; Merano-Bolzano, Italy.

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Journal of MEDICAL EDUCATION

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Suggestions for Contributors to the Journal

The *Journal of Medical Education* is the official publication of the Association of American Medical Colleges. It serves as an important international medium for the exchange of ideas in medical education, as well as a means of communicating the policies, programs and problems of the Association. The Journal operates under the direction of an Editorial Board appointed by the Executive Council of the Association.

Manuscripts

The Editorial Board is interested in manuscripts concerned with the broad field of medical education or any aspect of it; this includes preparation for medical education; the medical school experience; intern and resident education; graduate and postgraduate medical education. It is especially interested in educational experiments and pertinent reports from other educational fields.

The Editorial Board recognizes that medical education includes the activities of faculty, students, administrators and those of the practicing profession who also teach and learn. Thus, it invites communications from any of these sources.

The Editorial Board welcomes the submission of manuscripts concerned with the broad areas outlined above. The Editorial Board also solicits the writing of specific manuscripts. However, all manuscripts are carefully reviewed by the Board before acceptance for publication. For articles of greater length, publication is sometimes possible if publication costs can be subsidized. Manuscripts will be reviewed promptly. They will be "accepted," "returned for suggested revision, or "rejected." Authors should keep in mind the broad audience of the Journal and the increasing overseas distribution.

To expedite review, manuscripts should be submitted in duplicate. All copy, including footnotes, tables and legends should be typed double-spaced.

Each diagram or graph or photograph should have a brief legend. Each table should be typed on a separate sheet of paper. Photographs should have a glossy finish. All illustrative material should be packed with cardboard backing.

The author will receive galley proofs for correction before publication. Authors will receive 25 tear-sheet reprints without charge. Additional reprints may be ordered from the Editorial Office, 2530 Ridge Ave., Evanston, Ill.

Editorials

This section provides an opportunity for the expression of opinion on a significant problem or for highlighting an important program or a significant new development. Readers of the Journal are encouraged to submit editorials, which are, of course, reviewed by the Editorial Board. Communications of 750 words or less are preferred. The author's name or initials will appear at the end of each editorial.

College Briefs

Member schools are urged to send "College Brief" items on expansion, modernization, important faculty appointments, teaching experiments, course changes, innovations, etc. Grants for education and training and for construction should be mentioned. The listing of other than major research grants is not encouraged. This material should be received by the eighth of the month preceding publication.

Audio-Visual News

Contributions for the Audio-Visual News section are invited. Since not every issue of the Journal necessarily carries an Audio-Visual News section, only items of real importance in this field should be submitted.



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*The American Foundation: Medical Research:
A Midcentury Survey, Boston, Little, Brown
and Company, 1955, vol. 1, p. XXXI.

**Ibid., p. 600.

The Teaching of Preventive Medicine

Around the World

CARL E. TAYLOR

COMPREHENSIVE MEDICINE, with integration of preventive and curative work, is becoming an increasingly important emphasis in medical education in the United States. Other countries also are adapting these ideas to local conditions.

In Western countries curative medicine and public health each have developed so rapidly that they have grown apart. While curative medicine was concerned with the care of the individual, public health concentrated on preventive measures for the community. As noncommunicable diseases have become the leading health problems, preventive measures for individual patients are becoming increasingly important. This is bringing public health and clinical medicine together again. Public health makes use of curative techniques in attempts to control noncommunicable conditions such as cancer and heart disease, as well as communicable diseases such as syphilis. Conversely, in pediatrics, obstetrics and other specialties, there is increasing application of preventive methods.

In less industrially developed countries where the major health problems continue to be communicable diseases, the need for integrating preventive and curative medicine is even more acute. They cannot afford the luxury of providing enough doctors for separate curative and

preventive services. While taking care of existing medical problems, every doctor should assume responsibility for the application of preventive procedures. Preventive methods, applicable both at individual and community levels, should be an important part of the teaching of medical students.

United States

The outstanding feature of preventive medicine in the United States today is that certain generally accepted basic principles and attitudes are being presented to medical students by a great diversity of devices and imaginative experimental techniques.¹⁻⁷ This dissatisfaction with existing methods and drive to modify and improve has contributed to the rapid development of the field and has stimulated other countries which are beginning to launch similar programs.

Europe

Historically, preventive medicine as applied to communicable diseases developed early in Germany, England and France.⁸ The traditional pattern of teaching under the department title of hygiene or public health was firmly established on the prestige of pioneers in this field. Teaching

The Teaching of Preventive Medicine Around the World

gradually became a part time responsibility of local health officials. Courses declined in popularity because they were less and less useful to practicing doctors as full time health departments relieved practitioners of responsibility for preventive measures.

To break from this tradition required a major effort. It seemed desirable to dress the transition in the garb of a new name and a separate department. The main impetus for the new teaching, especially in schools in the London University orbit, came from specialists in internal medicine whose concern had been stimulated by the increasing mechanization of medicine. Students were so preoccupied with clinical and laboratory findings that they did not give the necessary balance to human, psychological and social factors. Ryle⁹ was the high priest of this medical reformation for which he used the name social medicine. His personal prestige and his resigning as Regius Professor of Medicine at Cambridge to start an Institute of Social Medicine at Oxford caused a considerable stir in the normal calm of British medical circles. Several other schools in Britain and the Dominions followed suit, at least to the extent of changing the names of their departments. In Belgium and northern France, Professor René Sands led a similar transition.¹⁰

In the past decade the original enthusiasm has leveled off in a series of teaching experiments. In many schools, especially in Scotland and the provinces, social medicine has developed as an expansion of the old departments of public health to include all social factors influencing health. New thinking appears to be more evident in research programs than in teaching. As far as terminology is concerned it is interesting

that the *Journal of Social Medicine* has in the past three years changed its name to the *Journal of Preventive and Social Medicine*.

On the rest of the continent developments in teaching preventive medicine have been spotty and slow. In Germany, postwar problems were so great that this type of educational experimentation was not feasible. For the most part the old concept of hygiene is still being taught. In Scandinavia there has been an impressive development of health work at the administrative and applied level. Integration of preventive and curative work has been well organized in state-supported health services especially in rural areas. A gradual expansion of the older concepts of teaching hygiene and public health in medical schools is taking place, but teachings appear to have lagged behind practical application. Of particular interest is a proposal to train doctors for service in Arctic regions.

Changes in the teaching of preventive medicine have been particularly slow in coming in the Mediterranean area. An outstanding exception is Yugoslavia where under the leadership of Professor Stampar comprehensive regionalized health service facilities have been used for coordinated experience for students.

Latin America

A desire for change and development is evident in some parts of Latin America. Most of the medical schools of Central and South America have been solidly established in the European tradition. Some schools are faced with the administrative difficulty that according to their national constitutions they cannot limit the numbers of students admitted but have to accept everyone who has

basic qualifications even when the numbers exceed 1,000 per class. With this many students it is apparent that communication between faculty and students is necessarily mostly one-way through didactic lectures.

Under the auspices of the Pan American Sanitary Bureau¹¹ two recent seminars on teaching preventive medicine have been held. In the first at Viña del Mar, Chile, most of the countries of South America participated; the second conference at Tehuacan, Mexico was for the countries of the northern fringe of South America, Central America, and the Caribbean. Effective use was made of group discussions in order to achieve a remarkable degree of unanimity of definition and purpose. Basic agreement was reached on principles which will require major and difficult overhauling of teaching methods and curricula. The pattern of preventive medicine teaching which has been recommended includes the best results of thinking and experimentation elsewhere which are being adapted to the needs of Latin countries.

Some attempts have been made to develop practical teaching programs with student participation. There has been appreciation of the need for training doctors for rural service. One of the things which has been tried in Colombia is to require interns to serve a year in improved health centers in groups of four. This permits them to have the advantages of mutual professional stimulation and consultation. Each of the interns has the opportunity of taking responsibility for the types of practice which he finds most interesting in a sort of embryonic group practice arrangement. The medical school tries to provide supervision and consultation.

Among these several projects

which have already been started, two which are particularly worth watching are at Puerto Rico and at Cali, Colombia. In Puerto Rico students are given opportunities to participate in the work of health centers which are being set up as part of a program of regionalization of medical care. The department of preventive medicine is also a school of public health. The place of preventive medicine in Cali Medical School is best indicated by their organizational chart which shows the department of preventive medicine as the oversized hub of a wheel with other departments radiating off in all directions like spokes. From the point of view of staff, budget, and teaching facilities it is perhaps the strongest department in the school.

India

My particular interest in the past several years has been in developing a program of preventive medicine teaching adapted to the needs of India.¹² A long period of preparation by Indian medical leaders, the Rockefeller Foundation, WHO, and other organizations culminated in the conference of Teachers of Preventive Medicine in spring 1955 and the All-India Medical Education Conference in October 1955. A major reorientation in medical education is planned. Two important principles directly related to the teaching of preventive medicine have been generally accepted.

1. Preventive and curative services must be integrated as rapidly as possible in order to provide basic health facilities for the millions of people who have had no medical help. Much of this will be done by government health services which are being fused both administratively and locally. Private practitioners should partici-

pate in preventive work. For a few of the major health problems such as malaria, tuberculosis, V.D. and leprosy it will be more efficient to train special teams of public health workers who will organize D.D.T., B.C.G., and venereal disease and leprosy case-finding programs and institute the initial mass campaigns. For the continuing long term job of holding the health advances which have been won it will be necessary to incorporate these specialized programs into the combined curative and preventive services.

2. The great challenge of health work in India is to reach the village people. In cities medical practice is becoming so crowded that competition between doctors for patients who can pay is as stiff as anywhere in the world. The 85 per cent of the people who live in the villages are for the most part dependent on practitioners of the ancient indigenous systems of medicine or on the many downright quacks. The improvement of the health of the people is a major objective of the ambitious schemes for crowding generations of progress into a series of Five Year Plans for national development. Health programs for rural areas are organized as part of the Community Development Projects which in the next five years are to cover all of India with development blocks of 60-100 villages with an average population of about 60,000. The special staff assigned to each block works with the objective of getting people to work for their own progress in all of the essential aspects of life. It is planned to have in each block at least one and as soon as possible two or three health centers.

The rural health center idea has been worked out in its major ramifications through years of experi-

mentation in the pilot projects set up by the Rockefeller Foundation in various parts of India and at places such as Tagore's Sriniketan and Gandhiji's Ashram at Wardha. Usually, medical care is provided in an outpatient dispensary where the doctor works in the morning. Sometimes 10 or more maternity and special beds are provided for complicated cases who do not want to go to the district hospitals. In the afternoons the doctor concentrates on preventive services, working in various health clinics or visiting villages with subcenters in which auxiliary health workers work and live.

The doctors have in the past refused to go to the villages for the obvious reasons that income is low, educational opportunities for their children are inadequate, they lack the stimulation of professional associates, and their social life is limited especially where transportation is poor. Some of these difficulties are being eliminated as the rural health center program is organized under government auspices with better salaries, adequate homes, transportation and coordination of work between centers.

Departments of preventive medicine have the opportunity of helping students to learn to appreciate the good qualities of village life and to understand rural health needs. With the assurance that comes from knowing that he has been trained to do the job of running a rural health center, a doctor will be more willing to accept the sacrifices that go with this kind of service. It will not be easy for them because the social and family pressure on young doctors in India, as elsewhere, is to look for the soft and most lucrative spots.

In order to provide rural orientation and experience, village health centers are used as teaching labora-

tories by several departments of preventive medicine. They are good bases for family adviser programs. Students, preferably in the preclinical years, are assigned to families for one, two or more years. In most places it is essential to provide transportation and use scheduled class time. Students learn principles of sanitation by actually working on simple installations in the homes of their village families. At Ludhiana we used medical students to gather data in general health surveys of villages as part of their course in biostatistics. This permitted stressing the point that good biostatistics requires careful collection of data in addition to its proper analysis once it is in hand. Participation in the work of health center dispensaries as part of their medical outpatient service in clinical years enables students to learn how preventive measures can be applied in general practice. They also work in various types of health clinics and observe public health services.

We found that students in preclinical years had great enthusiasm and broad biological interests. They spontaneously and quickly learned to use an ecological approach to family problems. Although this decreased some in clinical years we found that it was easier to maintain the ecological approach in students who had been exposed to the family adviser plan in preclinical years than to develop it in clinical students whose classes went through before the family adviser plan was started. According to new regulations the required year of internship is to include three months service in a rural health center.

An idea which originated at Vellore Christian Medical College and which we were also developing at

Ludhiana is to arrange for students to have part of their clinical work in a small rural hospital which is part of a health center. One of the distinctive features of these hospitals is that most of the equipment is made locally. Without sacrificing anything essential for good quality work an effort is made to use inexpensive things which doctors could have wherever they happened to work. Gadgeteering by both staff and students is encouraged in order to increase the ingenuity and self-reliance of doctors who will be isolated in places where they will have to improvise.

Southeast Asia

Other countries of Asia and the Middle East are going through much the same pattern of development as India. Specific features vary somewhat, but the trend is the same. It is difficult to isolate preventive medicine teaching from national programs to develop health services. Ceylon has progressed particularly in providing rural health services. Indonesia faces the additional handicaps which go with the transition from Dutch medical education to a pattern of their own which has yet to be designed. At Singapore the medical school has developed particularly good teaching in public health. Two medical schools in Bangkok are going to set up modern departments of preventive medicine and are training teachers. A conference on medical education in Thailand is to be held this fall. Vietnam inherited schools patterned on French medical education with the course requiring six years. American consultants have recently recommended abbreviation and reorganization with greater stress on preventive medicine.

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Japan

Medical education in Japan was strongly influenced by the German training of many early scientists. Most schools have had departments of hygiene and public health which had the traditional emphases. During the postwar period of military occupation American preventive medicine was superimposed on Japan and new departments of preventive medicine were established in medical schools. Unfortunately, the old departments of hygiene were not combined with the new and duplication has resulted in many schools. Public health measures have been applied with such thoroughness that dramatic improvements in national health have resulted. It will soon be necessary to change the orientation of medical education from the communicable to noncommunicable diseases.

Middle East

Much of the discussion about India applies to countries such as Egypt and Iran. As part of nationalistic drives to improve themselves these countries have growing appreciation of the need for adapting medical education to present conditions rather than continuing with systems patterned on European medical education in the last century. These changes will probably gather increasing momentum. At medical schools such as Baghdad the strong British influence led to considerable public health teaching. At Beirut a new program of medical student teaching has been developed in the Institute of Public Health which also trains several other types of health workers. Several countries such as Saudi Arabia have yet to develop medical schools. In Israel the prin-

cipal orientation has been toward traditional German medical education because many doctors came from Middle European countries. Since it is a new country there is a willingness to try new things which should lead to modernization of education. Health services are being well organized both at individual and community levels.

Africa

In South and Central Africa medical education has been influenced mainly by British traditions. Some departments of social medicine have been established and in several places experiments with family programs and health center teaching are being conducted. At the medical school at Durban, which trains mostly non-European students, a comprehensive program of family care has been developed by the Department of Family Practice.¹⁸

Soviet Russia and Communist China

Contacts with Communist countries in recent months indicate that new developments in medical education are quite different from the pattern of integration between curative and preventive teaching which is found through most of the rest of the world. In Russia the first drive to provide medical care to the whole population through basically trained "feldshers" has achieved its end. These men combined curative and preventive services to some extent. The emphasis now is completely toward providing high quality education and medical services.

In the administrative organization curative and preventive services are combined since everything is paid for and run by the government. Practitioners, public health workers and

research specialists carry out their individual functions within a unified administrative framework. A large fraction of medical graduates go into public health.

In medical education, however, a major separation is made between clinicians and public health workers. They attend different schools. The first two preclinical years are essentially the same. After that they pursue their distinctive specializations with the training in other fields being only sufficient to provide basic understanding. This separation of training is also true of pediatricians who attend separate schools and work in separate hospitals. It will be interesting to observe the effect this division early in the training period has on cooperation and working relationships later.

In China the Soviet pattern of medical education has been accepted. In talking with Chinese medical educators at a recent conference I tried to get an evaluation of the working of this dichotomy. My impression was that clinicians knew little of what public health workers were doing and vice-versa.

Need for teachers

The new departments of preventive medicine which are being established in many countries have created an immediate demand for qualified teachers. Present leaders have come from a variety of disciplines and have had to work out their own preparation on an individual basis. This diversity of background has provided a natural experiment demonstrating the types of preparation which have proved most useful for teachers of this specialty. It is clearly desirable to continue to have men of different backgrounds. However, because the need for teachers

to staff the many new departments of preventive medicine is so great, it has become necessary to develop a coordinated program of intensive postgraduate education.

An educational program for teachers of preventive medicine is being started at the Harvard School of Public Health in cooperation with the departments of preventive medicine in several medical schools. The group preceptorship program which is planned will have two important differences from the traditional pattern of one or two junior members of a department working as assistants to a senior professor. First, by training groups of ten to twelve at a time, it will be possible to develop more teachers. The more leisurely "one man and his disciple" arrangement by itself cannot meet the present worldwide demand. Group preceptorship methods are not new; they have an honorable history reaching back to the Greek philosophers and the Ashrams of ancient Hindu Gurus.

A second reason for the group preceptorship method is that students learn from each other by sharing points of view and a diversity of experience. What a person can learn while working in a particular department will depend somewhat on circumstances and the strong points of that department. With students from several medical school departments meeting together in regularly scheduled seminar sessions and doing practical work in six or more medical schools, each will learn from his colleagues by selecting from multiple learning situations basic principles applicable under varying conditions.

PREPARATION

The preparation of a teacher of

preventive medicine should include:

1. A good foundation of clinical training and experience.

To speak intelligently about the prevention of a disease, one needs to know the disease. Even more than treatment, prevention requires an understanding of causes. Symptomatic relief or complete cure may be arrived at empirically. Only rarely, however, are good preventive measures stumbled upon without knowing enough about causation to identify possible points of attack.

Many departments of preventive medicine are responsible for the supervision of family care programs, health centers or coordinated outpatient services in which curative and preventive work are combined. Teachers must be prepared to share in the clinical activities of these programs which provide opportunities for building instruction around patients or families with health problems. The teachers of preventive medicine should be able to join ward rounds or clinical pathological conferences and speak with authority on particular cases. Demonstration of clinical acumen will gain the respect of both medical students and staff members and make it possible to more effectively introduce the preventive emphasis in clinical situations. As emphasis shifts to health rather than disease, a good understanding of growth and development and mental health becomes increasingly significant.

2. Training in public health

Community efforts to maintain health in modern society are as important as individual efforts. A school of public health is a logical place to learn some of the basic disciplines of

preventive medicine because subjects such as epidemiology and biostatistics are organized as active departments. Without public health training, the teacher tends to present to students only the individual aspects of preventive medicine and is, therefore, unsuccessful in helping them to bridge the gap between curative medicine and public health. Doctors should not only know what community health facilities are available so they can use them, but should also know enough about their organization and functions to cooperate intelligently in the new mass programs for controlling noncommunicable diseases.

Departments of preventive medicine, especially in the less developed areas of the world, may have opportunities to function as the research and planning arms of official health services. They can contribute to the organization and evaluation of health and medical care programs. In the academic environment of a medical school a distinctive research contribution can be made in epidemiology, the discipline which deals particularly with the causation and distribution of diseases in groups of people.^{1,10} The staff should have sufficient standing in public health to merit the respect of their colleagues in this field as well as in clinical medicine.

3. Teaching methods

Few medical educators have had formal instruction in how to teach. The art and methodology of education are skills they are expected to pick up spontaneously. In the program being organized at the Harvard School of Public Health there will be a special seminar course in medical teaching organized in cooperation with the Harvard Graduate School

of Education. A year's practical teaching experience will be provided in the departments of preventive medicine of cooperating medical schools.

Postgraduate program at Harvard

In 1956 the first group of 11 candidates from India, Thailand, Japan, Canada and the U.S.A. were admitted. The program is for two years or in exceptional cases one year. Candidates come with different backgrounds, but in general fall into two classes. Most have been working in clinical medicine and some have been teaching in medical school departments of medicine, pediatrics, etc. Others have been working in public health or teaching public health. For each candidate an individualized program is worked out.

1. First Year

All candidates take the following basic courses:

(a) Seminars in Preventive Medicine—two hours a week throughout the year covering fundamental principles and methods of implementing and teaching preventive work.

(b) Ecology—biological and social. First quarter, three 2-hour periods a week. Consideration is given to the characteristics of human populations, organization and behavior of communities, and social, biological and physical factors in the environment.

(c) Seminar in Educational Methods—Fourth quarter, two hours a week in cooperation with Harvard Graduate School of Education. Discussion will center around pedagogical principles such as the psychology of learning and attitude change, and also the teaching techniques which are best adapted to various types of learning.

Those candidates who have a clinical background will take additional

courses from the Master of Public Health curriculum depending on their interests and qualifications. Those candidates who come from public health work with an M.P.H. degree or its equivalent need expansion of their clinical experience. Appointments will be arranged on the house staff of hospitals in the Boston area and participation in home care programs will be possible. During the summer candidates will work with research teams in order to learn methodology.

2. Second Year.

Each candidate will be assigned to the department of preventive medicine of a cooperating medical school. They will rotate through various teaching responsibilities under supervision.

To continue the group preceptorship educational experiment the whole group will be brought together once a month for two days of discussion. These monthly sessions will move as a peripatetic seminar in rotation to each of the participating medical schools. On the first day discussion will center on what is being done at the school being visited. On the second day consideration will be given to whether and how these methods can be applied in each of the schools represented in the group. The schools have been selected partly to get representation of the different types of educational procedures which are being tried.

During the final month of the second academic year students will return to Harvard for an intensive period of work to prepare a concrete program for their own schools. Detailed curricula will be drawn up and specific points of integration with other departments outlined. Facilities such as health centers or outpatient departments will be evalu-

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ated and budget and staff will be considered in detail with sources for each. Each candidate will present his program for thorough discussion by the group and will then prepare a detailed written statement to take back to his own school for implementation.

Basic principles of teaching

This review of the present status of the teaching of preventive medicine in various areas of the world is based mainly on subjective impressions from observations made either personally or by close associates. This is a field which is characterized by rapid growth and experimentation. Although teaching devices and course organization vary according to local conditions, certain basic principles have been found to work in many situations.

(1) Preventive medicine should be taught in both preclinical and clinical years.

(2) Of fundamental importance is the development and maintenance in students of a preventive attitude or approach which should permeate all medical work. To do this best prevention should be taught in or with other departments. Students remember preventive procedures particularly well if they learn them along with other aspects of a subject.

(3) In addition to general preventive orientation there are certain courses which should be taught either by a department of preventive medicine or perhaps by an affiliated School of Public Health. These courses should present basic subject matter in ecology, biostatistics, epidemiology and the community aspects of public health.

(4) The family as the basic social unit is an important link between the individual and the community. It has

been found that students can learn the application of preventive principles at all levels in the practical situations of a family adviser program of teaching.

(5) A health center is a useful teaching laboratory for preventive medicine. In areas where rural medical care particularly needs development rural health centers should receive priority.

(6) If separate departments of occupational medicine are formed there should continue to be close liaison with preventive medicine. Emphasis should be broadened to include more than industrial hygiene with due attention being given to farmers, white collar workers and other occupations.

(7) The greatest immediate need is for well trained teachers.

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La enseñanza de la Medicina Preventiva en los diferentes países del mundo

La Medicina "comprehensiva", que significa la integración de la Medicina curativa con la preventiva, ha ido convirtiéndose en los últimos años, en los Estados Unidos, en una parte importante de la Educación Médica. En otros países del Occidente, donde la investigación médica, así como las medidas de Salud Pública han experimentado un desarrollo igualmente notable, los conceptos básicos de la Medicina "comprehensiva" fueron adaptados a las condiciones locales. En los países de deficiente desarrollo económico, las enfermedades contagiosas y epidémicas constituyen aún el mayor problema de Salud Pública, y allí es especialmente grande la necesidad de una integración de la Medicina curativa con la preventiva, así como la necesidad de desarrollar

la enseñanza de esta última rama de la Ciencia Médica. En el presente trabajo, el Doctor Carl E. Taylor, Prof. del Dept. de Salud Pública de la Universidad de Harvard, ofrece un detallado estudio del estado en que se halla la enseñanza de la Medicina Preventiva en América, Europa, el Medio-Este, Japón, Asia del Sur-Este, África, la Unión Soviética y China. Aunque los métodos de enseñanza adoptados, así como el nivel de instrucción, varían grandemente según los diferentes países, el autor, en sus conclusiones, señala el hecho de que hay una serie de principios básicos comunes a toda enseñanza de tal índole, los cuales, siempre que han sido observados, han dado buenos resultados. Entre estos principios básicos el autor destaca los siguientes: enseñanza de Medicina Preventiva tanto para los estudiantes pre-clínicos como para los clínicos; enseñanza de la Med. Prev. en colaboración con otros Departamentos universitarios; ciertos cursillos en relación con problemas de Salud Pública; utilización del sistema de consejeros médicos de familia, como práctica para los estudiantes; utilización de los centros de Salud Pública como laboratorios de enseñanza de la Med. Prev. Pero, concluye el autor, la necesidad más urgente que hoy día se nota en el campo de la enseñanza de la Medicina Preventiva, es la de un número mucho mayor de instructores calificados.

* * *

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un mínimo de 25 lectores.

The Teaching of Psychology by Psychologists in Medical Schools

JOSEPH D. MATARAZZO AND ROBERT S. DANIEL

DURING THE ACADEMIC year 1955 a subcommittee of the Education and Training Board of the American Psychological Association sent an extensive questionnaire to the 346 psychologists known to hold appointments on medical school staffs in this country. The list of names of these 346 psychologists, believed to represent the total sample of such psychologists, was obtained through five months of correspondence with one or more key individuals at the 78 medical schools in this country. The range in number of psychologists in these 78 schools was from zero (10 schools) to 17 (one school), with a mean and median of four psychologists per medical school. The questionnaire was designed to reveal the professional activities of these psychologists in the areas of teaching, research, psychodiagnostics, psychotherapy, administration and admission selection.

The purpose of the present paper is to report the nature and extent of teaching and training supervision carried out by psychologists in these positions. Medical school curricula are expanding so rapidly and there are so many demands for additional subjects in the program that it would seem desirable to make available in-

formation concerning general trends. This is particularly important for the more recent additions, such as psychology, which have entered the medical field generally only in the last decade.

Psychologist's role in medical school

Fifty per cent, or 174 out of 346, of the questionnaires were returned. This sample included information from 57 of the 78 medical schools. The number of questionnaires returned ranged from 1 to 11 per medical school, with a mean of three and a median of two. In addition to the 57, 11 other medical schools are known to include psychologists on their staffs. These 11 schools were ones which the initial correspondence revealed had one or more psychologists; none of whom, however, returned the questionnaire. Thus 87 per cent of the 78 medical schools employ psychologists, and 84 per cent of these 87 per cent are included in this report. Respondents to the questionnaire were classified according to their graduate education and present employment in the following manner:

Group A. Full time medical school employment, PhD degree; 82 psychologists.

Group B. Part time medical school employment, PhD degree; 49 psychologists.

Group C. Full or part time medical school employment, MA degree; 43 psychologists.¹

From an analysis of the activities of these groups it is apparent that the three professional functions traditionally associated with psychologists (teaching, research, and clinical practice) also are found in the case of medical school psychologists. Approximately one-third of the total medical school time of each of the above named groups is devoted to one or another of these functions. The activity emphasized by the full time Ph.D.'s was research (34 per cent); by the part time Ph.D.'s, teaching (32 per cent); and by the M.A.'s, psychodiagnostics (37 per cent). Teaching was first in percentage of time for the part time Ph.D.'s, second for the full time Ph.D.'s, and third for the M.A.'s.

The place of medical school psychologists in the administrative organization of the medical school has not yet become fixed. Where several psychologists are employed, the most frequent pattern found is a fairly structured, although informal division of psychology within the department of psychiatry. However, in six of the 57 schools, there exists an administratively independent division of (medical) psychology. Since several additional respondents indicated that such an organization was being planned in their institution, this might be interpreted as a trend. In support of such a plan, it was frequently pointed out by respondents that an independent division or department facilitated the use of psychological services by all divisions of the medical school. In view of the recent nationwide trend toward "in-

tegration" and away from rigid departmental barriers (1, 2), the fact that 51 out of the 57 schools involved do not yet have autonomous divisions for psychology indicates the need for a careful study of the problem.

Teaching in which psychologists participate

Table 1 shows the number of schools in which psychological subjects are taught and the number of psychologists who do the teaching, classified by the type of students being taught, or supervised. For example, in 38 of the 57 schools sampled, a total of 82 psychologists are involved to some degree in the teaching of predoctoral medical students. Also from Table 1, it is seen that the wide range of students taught and the large percentage of schools in which most of them are taught, indicates clearly that in the majority of medical schools, psychologists participate in the teaching of a number of different student groups.

No clear trend emerged in regard to primary course responsibility. In schools where the unit system of courses is used, the psychologist typically is responsible for a unit in the psychiatric sequence, but he sometimes is guest lecturer for a limited number of hours in courses taught primarily by others. These courses cover a wide range of subjects from "general medical practice" to "psychodiagnostics." On the other hand, quite a few psychologists are fully responsible for their own course. For example, of the 82 psychologists teaching pre-doctoral medical students, 25 are alone responsible for a full semester (or trimester) course on a psychological subject.

Subject matter taught by psychologists

Titles of courses in which teach-

1. It should be noted that 32 of these 43 MA psychologists are still registered as university graduate students working towards their Ph.D. degrees.

TABLE 1
Extent of Teaching by Psychologists in Medical Schools

Student Group	Number of Psychologists (in 174 total)	Number of Medical Schools (in 57 total)
Medical students	82	38
Psychiatric residents	41	26
Other medical graduates	34	27
Nursing students	36	31
OT, PT students	11	9
Social workers	14	13
Psychological interns	65	40
*Psychology students	34	28
All others	13	13

*This category indicates the teaching by psychologists on part time appointment in another division of the university. All other categories represent teaching in the medical school.

ing psychologists participate gave little indication of the material actually presented by the psychologist. From course descriptions, textbooks utilized, and other sources, certain classifications can be made. These are summarized in Table 2. Entries in the table represent the aggregate tally of formal courses or training programs described by the respondents. Totals of the columns are not in agreement with the number of psychologists listed in Table 1 because a psychologist may be involved in more than one course and several psychologists may participate in a single course. In terms of frequency of incidence, the following pattern seems to typify the teaching role of the psychologist in the medical school setting at the present time. He is likely to teach:

1. A course in *Psychometric or Psychodiagnostic Techniques* to medical students, psychiatric residents, and students in the Graduate School Department of Psychology.

2. Formal courses in *Introductory Psychology, Abnormal Psychology*, and the *Psychology of Personality* to medical school students.

3. *The Professional Role of the Psychologist in a Medical Setting* to

medical students and nursing students. This is most often offered as a part of an orientation or survey course directed by another medical specialist.

4. *The Practice of Clinical Psychology* to psychiatric and other medical residents (usually pediatric) through participation in case conferences and seminars.

5. *The Practice of Clinical Psychology* to advanced graduate students in psychology through an intensive long term internship supervision within the medical school setting.

The lesser incidence of teaching situations shown by other entries in Table 2 undoubtedly represents individual medical school cases where there is a unique need or available teaching talent being utilized for more comprehensive training. Many of the respondents indicated that their school was planning a broadening of both subjects offered and students taught by the psychologist. Certain of the results shown in this table are interesting because of their infrequent incidence. One would expect, *a priori*, a much higher frequency of courses in Developmental Psy-

TABLE 2
Subject Matter and Type of Teaching by Medical School Psychologists
Total Number of Courses by Type of Student

Course, topic, or type of training	Medical Students	Psychiatric Residents	Other Medical Graduates	Nursing Students	OT, PT Students	Social Workers	Psychological Interns	Psychology Students	All Others	Total
General Psychology:										
Introductory	14			2	1	1				18
General Psychology:										
Developmental		1		3		2		1		7
General Psychology:										
Abnormal	25	1		2				4	1	33
General Psychology:										
Personality	13	1		1	1					16
Clinical Psychology:										
Survey		2		2		3		8		15
Clinical Psychology:										
Professional role of the psychologist	13	4		14	3	1			1	36
Clinical Psychology:										
Psychometrics and Psychodiagnostics	10	17		4	2	2	1	10		46
Clinical Psychology:										
Psychotherapy	2	1					1	1		5
Clinical Psychology:										
Research methods and supervision		4		1				4	5	14
Clinical Psychology:										
Case conferences and seminars	1	28	24	1	1		1		3	59
Clinical Psychology:										
Intern supervision	1	1					40	1		43
Electroencephalography	1	1							3	5
Miscellaneous and not specified	8	3	14	10	5	7	1	16		64
TOTAL	88	64	38	40	13	16	44	45	13	361

chology offered by psychologists. It is possible that this subject is emphasized in other courses, e.g. pediatrics, or taught by psychiatrists rather than psychologists. Although medical school psychologists are increasing their practice of psychotherapy within the medical school setting, this does not show up in their teaching, at least not in formal courses. Respondents mentioned offering course work in psychotherapy no more often than

they did course work in electroencephalography.

Psychologists' medical school titles

An important indication of the current as well as projected teaching role of psychologists in medical education is the academic positions accorded them by their institutions. The number of psychologists (listed by full time Ph.D., part time Ph.D., or M.A.) holding each of a number

The Teaching of Psychology by Psychologists

of titles is shown in Table 3. The results indicate that the 50 per cent sample of respondents included eight full professors, 23 associate professors, 41 assistant professors, three lecturers, and 40 instructors, making a total who hold academic rank of 115, or 66 per cent, of the 174 individuals who returned the questionnaire.

Conclusion

Comparison with some earlier figures (3) reveals that a large majority of medical schools have added psychologists to their professional staffs within the last few years. Along with sociologists and other representatives of the behavioral sciences, psychology is beginning to make a significant contribution to the program of broadened teaching of the general practice physician and to

certain medical specialists. This trend is a natural extension of the re-emerging "whole patient" or "Comprehensive Medicine" philosophy and approach to patient problems (2).

The particular contribution of the medical school psychologist seems to be in teaching, research, and clinical work. It was abundantly evident, in data from the questionnaire, that the psychologist's role is not yet fixed. All inferences which can be safely drawn from the results point to an expansion of the psychologist's activities, not beyond the three main functions, but within them. Although the psychologist's closest working contact at present is with psychiatry and neurology, he is beginning to widen his associations to include pediatrics, obstetrics, surgery, and such other medical fields as nursing, occupational therapy, and physical

TABLE 3
Medical School Title

	Group			Total
	A	B	C	
Professor	3	5		8
Associate Professor	15	8		23
Assistant Professor	27	14		41
Lecturer		3		3
Instructor	18	10	12	40
Consultant		3		3
Clinical Psychologist	1	1	2	4
Research Assistant			5	5
Psychologist	3		5	8
Psychometrist			2	2
Intern			2	2
Chief Psychologist	1		2	3
Medical Psychologist	2			2
"No Title"	1		4	5
Miscellaneous	6		8	14
No answer	5	5	1	11
TOTAL	82	49	43	174

therapy. This trend is shown not only in terms of subjects and students taught, as reported above, but also in research collaboration and clinical psychological referrals.

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Los Psicólogos en las Escuelas de Medicina

Este informe, basado principalmente en los resultados de una encuesta, emprendida en

1955 por la *American Psychological Association*, entre 346 psicólogos americanos, estudia detalladamente el papel del Psicólogo en las Escuelas de Medicina de este país. Dichos datos, así como también una serie de estadísticas, revelan que, si bien ese papel no está aun del todo definido, cada vez es mayor el número de Escuelas que emplean psicólogos y que, de acuerdo con la tendencia general hacia la "Medicina Comprensiva", éstos toman una parte cada vez más importante en la enseñanza, investigación y trabajos clínicos. Aunque por lo general el trabajo del psicólogo, dentro de las Escuelas de Medicina, ha estado limitado a los campos de la Psiquiatría y Neurología, indicios recientes señalan que su colaboración va extendiéndose también a otros campos, tales como la Pediatría y la Obstetricia, así como a varias formas de Terapéutica. El presente estudio va acompañado de varias tablas estadísticas y referencias bibliográficas.

* * *

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un mínimo de 25 lectores.

Students as Guinea-Pigs

G. A. MOGEY and G. WATKINSON

SINCE TREVAN's classic paper (1927) on the determination of toxicity, much work has been devoted to the development of quantitative methods for comparing the effectiveness of drugs, and although it is only in recent years that such methods have been applied to man they have already yielded much valuable information. Properly planned, controlled experiments have the great merit of providing reliable, and often clear-cut, information in the shortest possible time. When such experiments have been on man the results are often directly applicable to human therapeutics. There is, therefore, a great and increasing need for fit and ailing human volunteers on whom to assess drug actions in health and disease.

Limitations of animal experiments

Although animal experiments are eminently suitable for initial screening, toxicity, and standardization studies, many have no direct application to human pharmacology. It is, for example, no comfort to the man with a headache to be told that the drug prescribed is not toxic to white mice. Species variation may make comparison of drug action in different animals variable and unpredictable. The story of the lady who thanked her physician for preparing her cat for a journey with, "Pussy was so upset, doctor, I hate to think

what she would have been like without the morphine!" illustrates one well known species peculiarity. It is perhaps not so well known that atropine is relatively inactive in most rabbits, and has no mydriatic action on the avian eye; that hedgehogs tolerate large amounts of arsenic; and that rabbits eat *Amanita phalloides* with impunity although this fungus is extremely poisonous to man. The tolerance of rats to large doses of histamine is yet another bizarre species anomaly (its abolition by adrenalectomy suggests that endocrine factors may play some part in this phenomenon).

These few examples of the variation in the responses of different species show that it is essential to be very cautious in predicting how a drug will act in an unrelated species, and indicate how wide is the gap between human and animal studies. Animal experiments, however, are not, as antivivisectionists maintain, useless and only productive of needless animal suffering: they avoid the necessity of man having to expose himself to drugs not worth testing, and to dangerously toxic substances; and they frequently give a valuable indication of the likely experimental results in man—results which can, however, only be determined with absolute certainty by experiments on human beings, and preferably on volunteers.

Enlistment of volunteers

Where can enough suitable volunteers be found? Use has been made, particularly in America, of groups of conscientious objectors, and of prisoners over whom the state can exert some disciplinary control and for whom mitigation of their sentence provides the inducement to volunteer. The army method of "You! you! and you!" has much to commend it, but is unlikely to be tolerated in a civilian environment. Lack of funds for research makes the professional guinea-pig, popular in America, unobtainable in most British universities. The hard-up student or graduate visitor to America can make a small and certainly well-earned income at most research centers by allowing repeated observation to be made on his person. At a famous American clinic one of the authors, for a small financial consideration, permitted repeated gastric analyses, body-water measurements, and blood-histamine estimations to be made. He felt, however, that the reward for cardiac catheterization—thirty dollars—did not compare favorably with the danger-money paid to tightrope walkers, or to members of other hazardous occupations, and declined to co-operate. This investigation was almost obligatory to cardiologists in training at the clinic as it was thought to give them an insight into their patients' problems, as well as providing valuable physiological data on normal heart action.

The student body has been, and we hope will continue to be, a valuable source of volunteers for medical research. Such volunteers may not be truly representative of the group from which they are drawn or of the population as a whole—indeed some evidence exists, and will be presented later, that volunteers are

sometimes an extraordinary lot—but they are certainly more representative of the human species than, for example, some of the disciplined groups of the community previously mentioned.

The custom at Leeds is to invite students assembled for a lecture to volunteer. After the reason for doing the experiment, the value of the results expected, and the methods to be employed have been explained, a paper is passed round and those who want to take part write their names on it. Thus no obvious pressure is brought to bear on any individual to volunteer for a particular experiment; direct and private approaches might make refusal embarrassing.

The response has been reasonably satisfactory, although some projects have not aroused even a glimmer of interest. From any one year of students, of which some fifty regularly attend lectures, about twenty to twenty-five volunteers can usually be obtained. This number does not permit further selection, for it is nearly always necessary to use all who volunteer unless there is some imperative reason for rejection. Parents' consent has not been sought except when the volunteer is less than twenty-one years old; but, whether over or under twenty-one, they are asked to tell their parents or guardians about the experiment.

Reasons for volunteering

The motives of those who volunteer for experiments with drugs may be complex, but there is probably no need to analyze them when physical and objective responses, rather than psychical or subjective ones, are being investigated.

One of the more obvious motives might be related to the possibility of rewards—such as, in students, the

hope of endearing themselves to their teachers and examiners. This we believe to occur rarely, if at all; and, in any case, 20 per cent of the volunteers at Leeds take their examination elsewhere. Although a monetary inducement may have certain attractions it would undoubtedly influence the type of volunteer, and, while improving the sample, might vitiate the results.

In a recent experiment at Leeds a pharmaceutical firm, interested in the results, offered to reward those who participated, but this information was withheld until after the decision to volunteer had been taken. Eventually, a free trip to the research laboratories and the works of the firm concerned was chosen. It would be difficult to improve upon this arrangement, for such a visit cannot fail to be advantageous to a medical student.

Attempts have been made to explain on psychiatric grounds the motives behind volunteering for experiments. Volunteers have been likened to potential and established drug addicts and have been accused of justifying a latent self-destructive urge! Some may simply be searching for new experience, a new type of diversion, or a relief, however transient, from the humdrum of everyday life.

We believe it is much more likely that medical student volunteers want to gain more practical experience in the critical investigation of drugs in man, to obtain a better understanding of the subject, and to profit from the discussion which the experiments provoke. Some rightly feel that they are contributing to the advance of knowledge and so benefiting their fellow men.

Volunteer error

A group of volunteers may not always truly represent the population from which it is drawn. In the United States of America, for example, Lasagna and von Felsinger (1954) found that nearly half of a group of 56 supposedly healthy volunteers (almost all of whom were college students) were psychiatrically abnormal in various ways. No controls were studied, however, and one wonders how these volunteers would have compared with the general population in this respect. Kinsey and Pomeroy, in their famous sociological study, thought their volunteers esteemed themselves too highly (Maslow and Sakoda, 1952). The incidence of high-dominance feeling was found to be greater in volunteers than in non-volunteers by Maslow (1942).

Medical student volunteers present problems of their own. They certainly cannot be wholly representative of the general population, as they are usually young and highly selected for their intelligence and educational attainments. Because of the different interests of the various faculties they cannot be typical of university students as a whole, and year-to-year variation in the type and quality of the student groups may well exist. Previous knowledge of drug actions and toxic effects could, furthermore, influence, subjectively, the results of the experiment.

There may be sources of difficulty, other than the sampling errors already mentioned, to complicate the picture when the experimental animal is man. The power of suggestion may produce effects as marked as the pharmacological actions of many drugs, and bias in the observer may also profoundly influence the re-

sult. Many errors of this nature can, however, be eliminated if neither subject nor observer knows when active treatment or dummy drug is being administered. Inactive dummy treatments may yield valuable information about the effects of suggestion—a lactose preparation has produced effects comparable in nature and frequency to the side effects of antihistamine drugs (Report, 1950), and in a trial of cortisone in ulcerative colitis a few patients showed a remarkable improvement on an inactive treatment (Truelove and Witts, 1955). Great care is thus necessary in attributing any response to a drug.

Value of volunteer experiments

Although a somewhat gloomy view of the limitations of volunteer populations has been presented, many of these can be overcome by careful experimental planning. Indeed, experiments on medical student volunteers have already provided results of inestimable value.

One of the first such experiments, done at Leeds, provided detailed and accurate information about the relative potencies and durations of action of antihistamine drugs in man (Bain, 1949). Valuable methods for the assessment of analgesics have been evolved from work on volunteers in London (Keele, 1952); new drugs can now be accurately evaluated for this action in man before they are tried in patients, as recent experiments in Leeds with dipiprhone have shown (D. A. Cahal, private communication). The notorious variation in determinations of local anesthetic activity according to the test employed will in future be easily surmounted by using the elegant and accurate method evolved by Mongar from experiments on medical stu-

dents attending practical pharmacology classes at University College, London (Mongar, 1955).

Although some experiments do not greatly inconvenience the volunteer—for example, the determination of total body radioactivity (Burch and Spiers, 1954)—others do, and the volunteers deserve the highest praise. The recent attendance of a group of volunteers on five successive mornings at 5:30, their swallowing of Ryle's tubes—never a pleasant task—and then examining their stomach contents every fifteen minutes for three hours after the injection of a toxic dose of a drug, in order that the experiment could be completed before the normal working day started, indicates enthusiasm of no mean order (Dare and Moge, 1956). Not even the thought of intravenous injections of potent and noxious substances deterred those stout-hearted men and women whose co-operation has permitted an accurate correlation of human and rabbit responses to a bacterial pyrogen (Dare and Moge, 1954)—an important correlation because tests for pyrogens in therapeutic substances are usually performed on rabbits. Even neoarsphenamine has been accepted by intravenous injection when trivalent arsenical drugs were being examined for cortisone-like activity (G. O. Horne, unpublished).

Experiments on healthy volunteers are eminently suitable for the discovery of actions other than those of therapeutic value. Indeed, it is usually possible to assess such actions more accurately in a volunteer experiment than it is on patients. But although side actions are often similar in health and in disease it is not always so; for instance, pethidine, which usually causes euphoria in patients, frequently depresses healthy subjects.

Volunteer experiments in relation to therapeutics

To what extent can observations on healthy human subjects be correlated with responses in disease? It is well established, for example, that morphine and similar drugs are more likely to cause vomiting in healthy subjects who are up and about than in patients suffering pain in bed; that digitalis will increase the output of the failing heart only; that penetration of streptomycin into the central nervous system is greater in meningitis than in health; and that myasthenic patients are inordinately sensitive to tubocurarine. Antibiotics and other "specific" remedies can obviously be tested for their therapeutic effects in established diseases only, and likewise symptomatic remedies can only be tested in patients with the requisite complaints.

Nevertheless, it is, in general, probably safe to project results from normal volunteers to others, so long as drug responses are assessed by physical and objective methods. It is also obvious that experiments on healthy volunteers cannot adequately indicate all the therapeutic uses of a drug. A real need, therefore, exists for the volunteer patient. Fortunately his aid can usually be enlisted when the situation is clearly explained.

Summary

The problems connected with the use of volunteers, particularly students, for medical research have been surveyed. The reliability and limitations of experimental data so obtained have been discussed. Difficulties exist, especially in the assessment of subjective drug actions, but some can be overcome by careful planning. The healthy volunteer cannot provide all the desired informa-

tion about the therapeutic potentialities of new drugs; the volunteer patient is needed for properly controlled clinical trials.

We pay our respects to our student volunteers for their co-operation, courage, patience, and tolerance. May we long continue to enlist their help and enjoy the privilege of working with them.

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Los estudiantes de Medicina como "conejos de Indias"

En los últimos años, se han dedicado muchos esfuerzos a determinar la toxicidad de

ciertas drogas, y a desarrollar métodos para comparar su eficiencia. Aunque los experimentos con animales tienen su utilidad en ese campo, como en otros, los resultados tienen pocas veces aplicación directa a la farmacología humana. En cambio, ciertos métodos de experimentación con seres humanos, aun siendo recientes, ya han producido una serie de datos sumamente valiosos y aplicables a menudo directamente a fines terapéuticos. Hay pues una necesidad creciente de personas que voluntariamente se sometan a desempeñar el papel de "conejo de Indias". En los Estados Unidos, voluntarios de esa índole se hallan a veces entre grupos de "conscientious objectors" (es decir, los que por motivos religiosos se niegan a cumplir el servicio militar) o entre los condenados a presidio. También hay gentes que por dinero se prestan a experimentos científicos. En Inglaterra, donde la investigación médica científica cuenta, por lo general, con escasos fondos, son los estudiantes de Medicina los que constituyen una fuente va-

liosa de voluntarios. En el presente informe, los autores (del Dept. de Farmacología y Medicina de la Universidad de Leeds, Inglaterra), describen como funciona en la práctica ese sistema de "conejos de Indias" estudiantiles, y discuten sobre el valor científico de tales experimentos, en el campo de la Toxicología y en relación con la Terapéutica, así como sobre los modos de superar ciertas dificultades, especialmente en lo que se refiere a la evaluación del efecto, hasta cierto punto variable, que producen algunas drogas. Al concluir, se advierte que una persona sana que hace de "conejo de Indias", a menudo no sirve para producir toda la información deseada sobre las potencialidades de ciertas drogas, y que para muchos ensayos clínicos es preferible un *paciente* voluntario.

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Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

Medical Education in Germany

W. BARGMANN

A REPORT ON MEDICAL EDUCATION in the Federal Republic of Germany, intended primarily for American readers, must begin with a short description of the German university. The situation at universities in the Soviet Zone of Germany would have to be the subject of a separate article, since it differs in many essentials from that of the West German universities.

State universities

All German universities are institutions maintained by the state, i.e. by the eleven *Laender* of the Federal Republic of Germany. Their material upkeep, including the remuneration of university teachers, is the task of the Ministry of Education of each *Land*. The Rector, the Senate and the faculty committees of each university watch over the maintenance of freedom in research and teaching.

Every German university contains one or two theological faculties, and faculties of law, philosophy, medicine, and sometimes also agriculture and forestry. Some universities, where natural sciences do not form part of the philosophical faculty, also possess a faculty of natural science. Since every faculty endeavors to obtain the most highly qualified teachers and research workers that can be found, there is generally little difference in academic level between the faculties of the various universities.

"Freedom of movement"

The structural uniformity of the German universities, the relative equality in the standards of the faculties and, above all, the fact that medical education is subject to examination and study regulations that are *valid for the whole of the Federal Republic*, provide the essential conditions for the *freedom of movement* of the students. This principle of freedom of movement is a peculiarity of the German universities. Every student has the right to change his university as often as he pleases and to present himself for examination at whichever university he wishes. Freedom of movement enables the student to widen his horizon, both geographically and culturally, and especially to become acquainted with the personalities and opinions of different professors.* Thus the writer of this article attended lectures on pharmacology by Trendelenburg in Berlin and by Straub in Munich, on internal medicine by Friedrich Von Müller in Munich, His in Berlin, Wenckebach and Chvostek in Vienna

*If a medical student studies abroad, especially in Austria or Switzerland, at least part of the time so spent will be counted.

and Volhard in Frankfurt, on surgery by Lexer in Munich, Sauerbruch and Bier in Berlin and Eiselsberg in Vienna, and gained impressions which he values to this day.

Admission

Before going into the details of medical education as provided in the medical faculty of every German university in accordance with a uniform plan, I would like to say something about admission to the study of medicine. By virtue of the Basic Law of the Federal Republic, everyone who successfully completes his secondary education has the right to devote himself to the study of his choice. The university does not select medical students by means of an examination or psychological test, and may only restrict the number of students admitted when considerations of space make this necessary, that is to say, when there are simply not enough places available in the lecture rooms and laboratories. This happened, for example, in the years immediately after the war, when the destroyed universities had not yet been rebuilt and large numbers of students, released from the armed forces, were pressing for admission. Despite vigorous objections on the part of medical organizations, which fear the creation of a surplus of doctors enjoying an inferior social status, the medical faculties have not been able to agree to the introduction of a *numerus clausus*, determined by the need for doctors among the population. The number of young people enrolling as students of medicine thus depends first and foremost on how many pupils graduate from secondary school in any given year, on their estimate of their professional prospects and on the capacity of the medical institutes. In Germany there

is much discussion as to whether one should rely solely upon examinations taken in the course of university study to provide a suitable supply of future doctors.

The study of medicine lasts at least 11 semesters. As a rule, freshmen enter the university in the summer semester although it is also possible to begin in the winter (1st November). Of the eleven semesters, five form the preclinical section of the course and comprise compulsory lectures and classes, attendance at which must be proved before a candidate may present himself for examination, in the following subjects: physics, chemistry, zoology, botany, anatomy (including histology, embryology, physiology and physiological chemistry.) Besides these, there are optional lectures on a wide range of subjects which the student can attend according to his interests and the time available. Medical faculties attach great importance to the use made by students of the many educational opportunities at the university, according to their own inclinations. It is good to know that many of our students also attend lectures on philosophy, the history of art, music, languages, etc.

Lecture is traditional

The traditional form of instruction in the German universities is the lecture, in which a teacher presents facts and discusses problems, often before an audience of several hundred students. Attempts are being made to introduce instruction in small groups, where discussion is possible, in the compulsory subjects. So far, group instruction only takes place in optional seminars and in some compulsory practicals. In the future, the lecture is to be retained but, in some cases, it is to be reduced in favor of

group work, in order to make individual tuition possible. Efforts to achieve this entail the provision of more teaching posts by the state and, for external reasons, this is only happening and can only happen gradually. The demand for more university teaching posts, not only in the medical faculties, is an especially important point in the program of university reform which has been advocated in recent years.

An idea of the scope of preclinical instruction can be gained from the following figures for hours of compulsory lectures and classes, which apply to the University of Kiel but are, in the main, equally valid for other universities: first semester, 25 hours a week; second semester, 39 hours a week; third semester, 24 hours a week; fourth semester, 32 hours a week; fifth semester, 13 hours a week. The drop in the number of compulsory hours during the fifth semester is intended to give students enough time to prepare for their examinations. Students are not compelled to attend lectures but they must be able to show that they have registered for lectures in the compulsory subjects when they present themselves for examination. It is thus left to the student to decide whether he will gain the required knowledge by attending lectures or by some other means. Compulsory attendance at lectures contradicts the German conception of academic freedom. Only in the practicals is regular attendance and successful work demanded and it is possible to refuse a student his certificate for satisfactory attendance at practicals (dissections, physiology, physiological chemistry, etc.) and to insist that he repeat the course if his work has not been satisfactory.

Preclinical study ends with a pre-

liminary examination, the so-called *Physicum*, which covers all the subjects mentioned above. The terms of admission for this examination requires that the candidate shall have worked for at least eight weeks as a nurse in a hospital, either before or during his preclinical study. After passing the *Physicum*, the junior student (stud. med.) enters on the clinical section of the course as a senior student (cand. med.).

Clinical instruction

During the first three semesters of the clinical course the student must attend lectures and classes in theoretical clinical subjects such as pathology, pharmacology and hygiene. In this part of the course, too, lectures are the chief means of instruction. In them, the professor presents patients and discusses their diseases. This form of lecture, combined with a clinical demonstration, was brought to considerable perfection at the end of the 19th and beginning of the 20th century. It has exerted a decisive influence on generations of students and on the methods they subsequently employed. The main purpose of instruction in the clinical disciplines is to train students in logical, critical thinking as the cornerstone of all medical practice. On the other hand, prominence is not given to the subject of therapy because the general opinion of German medical authorities is that this is better learned by instruction and supervision in the period of training after study at the university. Clinical instruction is thus of a largely theoretical nature.

During the clinical semesters contact with the patient is confined to the examination of cases by percussion and auscultation, visits to various clinics and practical courses in all branches of medicine. During the

vacations (i.e. for a period of three months), however, students usually undertake clinical work under the supervision of doctors in either university or other hospitals, according to their choice. In the years since 1945 this important voluntary work has suffered from the fact that very many students have been obliged, for economic reasons, to use their vacations for earning money.

"Staatsexamen"

The weekly schedule for clinical instruction is similar to that of the preclinical period and, as in the latter, no intermediate examinations are set during the three years of clinical study to decide who shall continue with the course. Not until the end of the sixth clinical semester must the student submit himself for his final examination, the so-called *Staatsexamen*, which generally extends over a period of anywhere from 10 weeks to 12 months. The final examination covers the following subjects: I pathological anatomy and general pathology; II pharmacology; III hygiene, including bacteriology, serology and preventive medicine; IV medical jurisprudence; social medicine and questions relating to the profession of medicine; V internal medicine; VI surgery; including orthopedics and topographical anatomy; VII gynecology and obstetrics; VIII pediatrics; IX dermatology and venereal diseases; X ophthalmology; XI oto-rhino-laryngology; XII psychiatry and neurology. In these examinations the candidate is required to show not only theoretical knowledge but also proficiency in methods of clinical examination and treatment.

Medical assistant

After the student has passed his final examination, he has to work for

two years as a *medical assistant* at a university or other hospital or, in certain circumstances, in the practice of a doctor who is permitted to employ medical assistants. During this period the medical assistant, who is soon to be entrusted with important functions and responsibilities, receives what is admittedly a mere pittance, though board and lodging are, of course, included. At least six months of this training must be spent in a ward for internal medicine, at least four months in a surgical ward and the same in an obstetric and gynecological ward. Within these two years, moreover, two reports must be submitted in the field of social medicine or on the examination of patients for disability pensions and these must be approved by the authorities. The final assessment of the medical assistant must not only take into consideration the question whether the young doctor possesses the necessary intellectual and practical abilities to carry on his profession but also whether his character is suited to the work. At the completion of his training, the medical assistant receives the so-called *Approbation* from the authorities of the *Land* and is thus entitled to exercise his profession in his own right. Special regulations, which cannot be touched upon in this article, exist for the further training of specialists.

As a rule, the medical assistant has already taken the degree of doctor of medicine. Most students undertake a piece of scientific research while still in their clinical semester and then present the result as a doctoral dissertation after the *Staatsexamen*.

At the present time in Germany there is much discussion as to whether the system of medical education outlined above is really adequate to meet all legitimate demands

and desires. One finds, for example, considerable difference of opinion about whether an intermediate examination should not be included in the preclinical course—perhaps in the natural sciences after the second semester—and about whether clinical problems should not to some extent be made a part of the preclinical course. Experiments in holding common lectures for clinical and preclinical students together have met with considerable success; they bridge the gap between theory and clinical practice. To give only one example, there is in Kiel a lecture on the endocrine system, which is well-attended by preclinical and clinical students. The lecturers are the professor of internal medicine and the anatomist.

Putting such reforms into practice means cutting down and regrouping in many traditional fields of teaching. In the coming years medical faculties will be pressing forward with many changes in their curricula but, since these changes necessitate a considerable increase in university staffs and since they have to be provided with a firm basis in law, our reformers of medical education are facing a period of intense struggle.

La Educación Médica en Alemania

Este informe comienza con una descripción del sistema universitario alemán en general, el cual muestra algunas diferencias fundamentales con respecto al sistema prevalente en los Estados Unidos. En primer lugar, todas las Universidades alemanas son instituciones del Estado; todas tienen Facultad de Medicina, y, gracias a la uniformidad general del *curriculum* y *standards* de enseñanza, los estudiantes pueden cambiar de Universidad en el curso de sus estudios tantas veces como quieren, lo cual contribuye a ensanchar su horizonte. No hay en Alemania admisión selectiva de los estudiantes de Medicina: toda persona graduada de las Escuelas Secundarias tiene derecho a matricularse en una Facultad de Medicina. El período de estudios de Medicina es de 11 semestres, de los que 5 se dedican a

la instrucción pre-clínica (Física, Química, Zoología, Botánica, Anatomía, Histología, Embriología, Fisiología y Química fisiológica). La forma tradicional de enseñanza en las Universidades alemanas es la de conferencias, en las que el profesor presenta y discute datos y problemas, generalmente ante una audiencia de varios centenares de estudiantes. Aunque la asistencia no es, por lo general, obligatoria, pues eso iría en contra del concepto alemán de la libertad académica, los estudiantes, para poder presentarse a los exámenes, deben probar que han estado matriculados en algunos de los cursos sobre las materias arriba mencionadas. Instrucción en grupos pequeños no tiene lugar hasta ahora—pese a ciertos esfuerzos recientes en ese sentido—a no ser en algunos seminarios y en ciertos ejercicios prácticos obligatorios. Los estudios pre-clínicos terminan con un examen llamado el *Physicum*, que abarca todas las asignaturas ya mencionadas. Durante los primeros tres semestres del curso clínico, los estudiantes están obligados a asistir a algunas clases de Patología, Farmacología e Higiene. Durante el período clínico, las clases consisten, por lo general, en conferencias combinadas con demostraciones clínicas, un método de enseñanza cuyo desarrollo data de fines del siglo pasado, y que ha ejercido una influencia decisiva sobre varias generaciones de estudiantes. Por lo general, la instrucción clínica es pues, a diferencia de lo que sucede en este país, enseñanza teórica, y su propósito es entrenar a los estudiantes a pensar lógica y críticamente, dejando los problemas de Terapia para la instrucción clínica práctica, que tiene lugar ya fuera de la Universidad, después de haber el estudiante pasado el *Staatsexamen*. Este examen final se extiende sobre períodos que pueden variar, a veces, de 10 semanas a 10 meses, abarcando las materias siguientes: 1) Patología General y Anatomía patológica; 2) Farmacología; 3) Higiene (incluyendo Bacteriología, Serología y Medicina Preventiva); 4) Jurisprudencia médica y Medicina Social; 5) Medicina interna; 6) Cirugía; 7) Ginecología y Obstetricia; 8) Pediatría; 9) Dermatología y Enfermedades venéreas; 10) Oftalmología; 11) Laringología, y, 12) Psiquiatría y Neurología. A este examen final, tras el cual el estudiante, si presenta al mismo tiempo una disertación, adquiere el título de M.D., sigue un período (obligatorio) de 2 años de trabajo como *asistente médico* en algún hospital, después de lo cual recibe la licencia para practicar. Actualmente tal programa de Educación Médica es objeto de muchas discusiones en Alemania, y el autor del presente informe señala los puntos esenciales de éstas.

An Automatic Examination Machine for Medical Students*

J. C. SCOTT AND N. B. BURKE

OBJECTIVE TYPE examinations which utilize multiple choice answers have become increasingly popular with medical boards and teaching departments of medical schools. Some advantages of this kind of examination are: speed and accuracy of scoring, better sampling of subject matter, elimination of the subjective element in grading, and data which may be evaluated statistically for the benefit of both the student and the instructor. One disadvantage may be the failure to measure the student's ability to organize and integrate his knowledge. The advantages in specific medical school subjects, statistical methods of evaluation and reliability compared to essay examinations have been reported^{1, 2}.

This department has employed this type of examination along with the essay-type for many years and it seems to us that there are good reasons for retaining both forms in a teaching department. Regardless of the type used, examinations may set up psychological road blocks in the path of student learning and their necessity has been debated³. However most teachers probably agree that periodic examinations are justified for two reasons: they provide the student with the necessary stimulus

for reviewing the subject matter and they give the instructor and the student a measure of his knowledge of the subject. The importance of providing the student with some relative measure of his current knowledge deserves emphasis. Too frequently this information comes to him too late, that is, after an official examination in which the mark may determine his success or failure. In some departments two or three such examinations determine his success in the entire course. As a result of this system the average student is in a state of continual apprehension and in spite of the strenuous "boning up" before stated examinations, may find his score well below his expectations when the grades are returned. Also it is unlikely that residual working knowledge is measured accurately under such circumstances.

As a means of partially correcting these student handicaps we have constructed a machine which enables the student to evaluate his knowledge of the subject in private and at his own convenience without credit or penalty attached to the scoring.

Description and operation†

†The construction of the machine was supported in part by U.S.P.H. Grant-#H-2003-R and U.S.P.H. Grant #H T 288-C-6.

Additional machines will be constructed if a sufficient number of requests are received.

*Exhibited at the fortieth annual meeting of Federation of American Societies for Experimental Biology in Atlantic City, April 1956.

An Automatic Examination Machine

The machine consists of three parts: (1) a rotating drum upon which are typed 50 questions, (2) a control box, on the panel of which are five push buttons for selecting one of five answers, a button for advancing the drum to the next question and a counter which adds the correct score, (3) a registration box containing three banks of 50 counters each. Here the response to each question is tabulated as correct, incorrect or omitted and the data may be analyzed at convenient intervals.

In operation the student reads the question, pushes one of the five "answer" buttons and then the "advance" button. No other manipulations are required.

If the correct answer has been chosen, a green light is activated briefly and the counter adds one digit. If an incorrect answer has been chosen a red light is activated

and no registration occurs on the counter. In either case the next question is presented after an interval of a few seconds. If the student does not know the answer to a question, a "skip" button may be used to advance the next question. In this case no registration occurs on the score counter. Upon completion of the 50 questions, simple multiplication of the figure on the counter by two gives the percentage score for the examination. The counter is now reset to 000 and the machine is ready for a new examinee.

The types of question used are similar to those adopted by several medical boards in which the answer or combination of answers is selected from a choice of three or five possibilities. Five types have been used and no doubt other varieties could be adapted to the machine. Examples of each type used follows:

QUANTITATIVE RELATIONSHIPS (QR.)

The following paired statements describe two entities which are to be compared in a quantitative sense. Push button A, B or C

- A If A is greater than B
- B If B is greater than A
- C If the two are equal or very nearly equal

Question: A. Normal diastolic pressure
B. Diastolic pressure in aortic insufficiency

Answer: ☒ A ☐ B ☐ C ☐ D ☐ E

CORRELATIONS (Cor)

(A, positive; B, negative; C, neither)

Each of the following pairs of phrases describes conditions or quantities which may or may not be related. Push button A, B or C.

- A If increase in first is accompanied by increase in second, or if decrease in first is accompanied by decrease in second.
- B If increase in first is accompanied by decrease in second, or if decrease in first is accompanied by increase in second.
- C If second remains constant, or approximately constant, when the first increases or decreases.

Question: A. Pulmonary Blood Volume
B. Vital capacity

Answer: A ☒ B ☐ C ☐ D ☐ E

FIVE CHOICE COMPLETION (FCC)

Each of the following questions or incomplete statements is followed by five suggested answers or completions. Select the one which is best in each case and indicate your selection by pushing the appropriate button.

Depolarization of the ventricles occurs during the

- Question: A. P-R interval
B. QRS interval
C. S-T segment
D. T wave
E. T-P interval

Answer: A ☒ B C D E

MULTIPLE COMPLETION (MC)

For each of the incomplete statements below, ONE or MORE of the completions given are correct. Decide which completion or completions are correct, and push button

- A. if only 1, 2, and 3 are correct
B. if only 1, and 3 are correct
C. if only 2 and 4 are correct
D. if only 4 is correct
E. if some other completion, (or combination of completions of those given) is correct.

Question: Coronary Flow is increased by:

1. Increased aortic pressure
2. Epinephrine
3. Anoxia
4. Pitressin

Answer: ☒ A B C D E

STATEMENT AND REASON: (S & R)

Each of the following sentences consists of two main parts, a statement and a reason for that statement. Push button:

- A. if the statement and proposed reason are both true and related as cause and effect
B. if the statement and proposed reason are both true but not related as cause and effect.
C. if the statement is false, and the proposed reason is an accepted fact or principle.
D. if the statement is false, and the proposed reason is an accepted fact or principle.
E. if the statement and the proposed reason are both false.

Question: One can hold his breath longer after voluntary hyperventilation primarily because hyperventilation increases the arterial pO_2

Answer: A ☒ B C D E

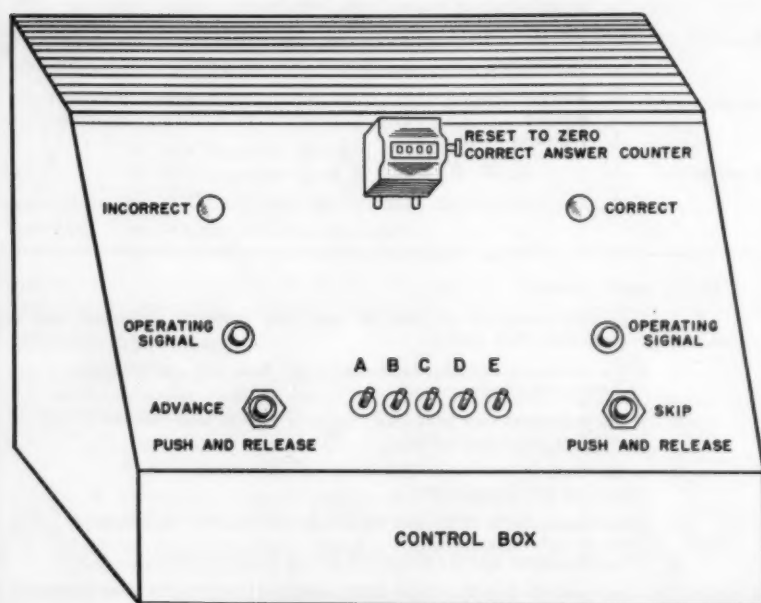
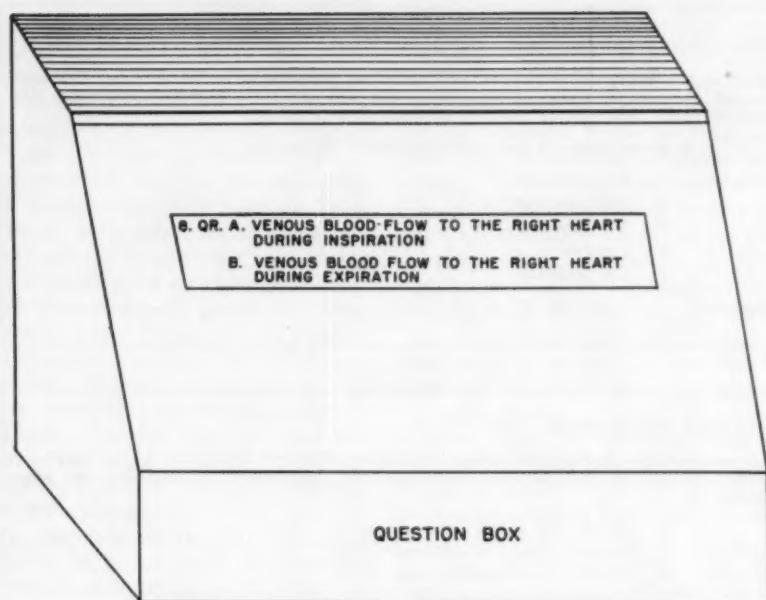


Figure 1. Illustration of the control box and question drum of the Automatic Examination Machine. The registration box is not shown.

Construction Details

The drum containing the 50 questions is wired to a 50 position stepper switch which in turn is synchronized to a second 50 position stepper switch. The rotors of 50 single pole five position switches are connected to the 50 contacts on one of the stepper switches. The five contacts are paralleled and then terminated at the five position "answer" switch rotors. The open contacts of the switch are tied together and terminate at one contact of the right or wrong relay winding. The other contact of this relay goes to ground voltage and is fed to the rotor of the same stepper switch. The 50 five position switches are keyed for each new set of questions. Therefore if the push button answer switch corresponds to the proper setting of the five position switch the relay closes and this activates the correct circuit.

The sequence of operation following the depression of one of the five answer buttons is initiated by pushing the "advance" button or the "skip" button. This starts the timing motor and applies voltage to the proper bank of counters. At the same time scoring by means of lights and the reset counter takes place. This is accomplished by using two latching relays working with a micro-switch. One second later the scoring lights go off and voltage is removed from the counters. A second micro-switch activates the latching relay. The drum is then advanced and the first stepper is advanced. One second later the second stepper switch is advanced, the timing motor stops and a new cycle may be started with the next question.

Discussion

The machine has been in use for several months in the physiology department. It is made available to the students during their free time and the questions are changed at intervals of two or three weeks in order to cover each new section of the course. The students appear to benefit from its use and for the most part enjoy the opportunity of taking an examination which "doesn't count" and yet gives them an objective appraisal of their knowledge of the subject. Frequently they are surprised at their own misunderstanding of some aspect of subject, a situation they might not otherwise have realized until after taking a formal examination. Rather than having the

machine give them the correct answers they are encouraged to note the areas of the subject in which they are deficient and to discuss these topics with their instructors or fellow students at a later date. The voluntary and informal nature of the examination is more likely to measure the working knowledge of the student than the "crammed" information acquired just before regular stated examinations.

The registration box (which need not be in the examining room) records the response to each question as correct, incorrect or omitted. After a sufficient number of students have taken the examination the total score for each question may be evaluated statistically thus giving the instructor an opportunity to analyse the data. If a sufficient number of students answer a question incorrectly it may be desirable to discuss the point in lecture or conference. On the other hand, if a question is omitted frequently it may indicate that the item received too little emphasis on original presentation. The data also serves as a proving ground for development of questions which are free of ambiguities and irrelevance.

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Exámenes por medio de una máquina

Los autores de este trabajo (Profesores del

An Automatic Examination Machine

Dept. de Fisiología del *Hahnemann Medical College* de Filadelfia) informan detalladamente sobre el funcionamiento de un aparato por medio del cual se puede examinar a los estudiantes "mecánicamente". Esta máquina, que se usa tan solo para exámenes no obligatorios, transmite mediante un botón las preguntas, y con ellas una serie de respuestas entre las que el estudiante ha de escoger, y registra luego la contestación como "correcta", "incorrecta" u "omitida". Dicha máquina está en uso, desde hace algunos meses, en el Dept. de Fisiología de la Universidad mencionada. Los estudiantes, que pueden usarla cuando quieran, fuera de clases, obtienen al parecer, dicen los autores, mucho provecho de ese modo de llegar a una apreciación com-

pletamente *objetiva* de sus conocimientos (las preguntas son cambiadas periódicamente de acuerdo con los diferentes cursos) sin tener que someterse por ello a un examen que "cuenta". También los profesores pueden por ese medio darse cuenta del nivel general de sus estudiantes, ya que después que un número suficiente de éstos se ha presentado a los exámenes "mecánicos", los resultados son tabulados y pueden ser evaluados estadísticamente. Y se estimula a los estudiantes a discutir con instructores y colegas las materias en las que el aparato revela deficiencias.

* * *

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un mínimo de 25 lectores.

American Medical Education from the Revolutionary War to the Civil War

WILLIAM FREDERICK NORWOOD

HAD THE FOUNDING fathers in the Congress of the Confederation, after General Washington's victory at Yorktown in 1781, busied themselves with such domestic affairs as the state of medical education in the fledgling nation, a duly appointed committee would have found relatively little to report concerning formal institutional medical education. Except for a very few examples of local or provincial societies within the profession, medical men had not yet begun to manifest the measure of gregariousness which now characterizes the profession. Hence, long range planning of medical education had not received the collective attention of medical men themselves at the provincial or national level.

Certain processes of medical education were in motion before the Colonies rebelled against England's paternalism. The apprenticeship in medicine had long been the conventional access to the practice of physick and surgery. A very few lecture courses in limited areas (particularly anatomy or midwifery) are known to have been offered by successful practitioners. By the end of the 18th century, 32 American colleges possessed charters, authorized by royal decree or legislative act, which were sufficiently broad in their wording to justify the giving of medical degrees, but only 10 instituted in-

struction before January 1, 1801.

They were: College of Philadelphia (1765), King's College (1767), William and Mary College (1779), Harvard College (1783), University of the State of Pennsylvania (1783), University of Pennsylvania (1792), Columbia College (1792), Queen's College (1793), Dartmouth College (1797) and Transylvania University (1799). During the Revolutionary War (1779) William and Mary College established a chair in anatomy and medicine, but only one medical degree was ever conferred, an honorary M.D. in 1782. Two other institutions, Yale College and Washington College of Chestertown, Maryland, offered no instruction during this period but gave both *ad eundem* and honorary M.D. degrees. Transylvania University conferred no degrees in the 18th century. The charter of Connecticut State Medical Society empowered it to confer the doctor of medicine degree. Since this society offered no instruction, the 14 M.D. degrees which it handed out classify as *ad eundem* or honorary.

18th century degrees

Frederick Waite has logically classified the medical degrees of this late 18th century period approximately as follows:

M.B.—the first medical degree,

offered by America's first medical schools at the College of Philadelphia and King's College, and patterned after the British system. All schools in time abandoned it for the initial M.D.

Advanced M.D.—available to holders of the M.B. degree, after an interval of time and evidence by examination or presentation of a thesis, of satisfactory professional progress.

Initial M.D.—the conventional Doctor of Medicine degree which all but Harvard and Dartmouth had substituted for the M.B. and the advanced M.D. by the turn of the century.

Honorary M.B. or M.D.—degrees given as a mark of distinction to apprentice trained or self-made physicians who were deemed competent and worthy of the honor.

Ad eundem M.B. or M.D.—degrees conferred on physicians who had previously received medical degrees. At times, the conferring of an *ad eundem* degree was not distinguished from an honorary degree.

According to Waite's classification and findings, each institution listed in Table I (including the pre-war activities of College of Philadelphia and King's College) conferred its first degree in the year indicated and conferred the types and number of degrees as enumerated, before the turn of the century.²

The ancestries of most of the 20th century medical schools which trace their lineage back into the 18th century are characterized by legal tangles and professional quarrels in their early years. Antiquarians have haggled over the relative seniority of these early medical schools. Only the medical schools of the University of Pennsylvania, Harvard College and Dartmouth College entered the 19th century with a good lease on life.

Old-world medical education

The budding of American institutional medical education during the last three and one-half decades of the

TABLE I
American Medical School Statistics Before January 1, 1801

First Med. Degree	Institution	M.B.	Adv. M.D.	Initial M.D.	Hon. Ad M.B.	Ad Eundem M.B.	Hon. Ad M.D.	Ad Eundem M.D.
1768	College of Philadelphia	29	8	8				45
1780	University of the State of Pennsylvania.....	67	7				1	75
1792	University of Pennsylvania.....		1	78				79
1768	King's College	12	2				4	18
1793	Columbia College.....			16				16
1792	Queen's College	3		6		3	3	15
1783	Harvard College	29	1		1	16	4	51
1782	Dartmouth	9				1	3	13
	Yale College						5	2
1782	William and Mary College						1	1
	Washington College						1	1
1793	Connecticut State Medical Society						10	4
	Totals	149	19	108	1	1	39	18
	Duplications							23
	Individuals who received degrees.....							312

18th century was extensively influenced by old-world medical education, especially Scottish and English. The medical apprenticeship in England was seven years in length, patterned somewhat after the guild system of the crafts. The medical apprenticeship in America was rarely more than three years and legal indenture was not common. In the 18th century an increasing number of Britishers began entering medicine by way of university study which did not prescribe apprenticeship. The University of Edinburgh, in particular¹, became the mecca of American youth who sought institutional instruction and were financially able to study medicine abroad. There was a very practical reason why Americans, well into the 19th century, favored Scottish medical education. The English schools required a B.A. degree for admission; and after three years of attendance on lectures in Latin, a Bachelor of Medicine degree was granted. The M.D. degree came only to holders of the M.B. degree after seven years in practice, presentation of a satisfactory thesis, and the passing of additional examinations.

At Edinburgh, although no preliminary degree was required, some intellectual competence and knowledge of Latin, natural history and related areas were expected. Lectures were in English. Attendance on three terms, submission of an acceptable thesis, and passing of examinations were requirements for a Doctor of Medicine degree. John Morgan and William Shippen, who pioneered the College of Philadelphia curriculum in medicine in 1765, were Edinburgh graduates, as were also 112 other Americans by the end of the century. An equivalent number studied in Edinburgh without receiving the de-

gree. Later the school in Paris became popular with Americans.²

The founders of the College of Philadelphia medical school in 1765 conceived of their two-term curriculum as a supplement to and not a substitute for the preceptorial system. The requirements for the medical degree in this first school included evidence of a satisfactory apprenticeship and a knowledge of pharmacy. Students entering upon a course in medicine were required to be college graduates, or in the opinion of the trustees and professors to have acquired a satisfactory knowledge of Latin, mathematics, and natural and experimental philosophy. Each student was to attend one course of lectures in anatomy, materia medica, chemistry, and theory and practice of physic.³ The specified requirements also included one course of clinical lectures and one year attending the practice of the Pennsylvania Hospital. The proximity and adequacy of this hospital was a vital factor in the initial success of American's first medical school.

On completion of this curriculum, candidates recommended by the faculty were permitted to appear for a public examination leading to the M.B. degree. The M.D. degree was reserved for candidates, who three years or more after receiving the M.B. degree, were 24 years of age and had prepared and publicly defended a thesis approved by the faculty.⁴

In 1789 the reorganized medical faculty of the College of Philadelphia abolished the M.B. degree. When in 1792 the medical department of the University of Pennsylvania superseded the two previous medical institutions in Philadelphia it offered no M.B. degree but conferred the M.D. at the close of a three-year preceptorship and two terms of residence

in course, which activities could run concurrently. The premedical requirements were eliminated and a required course in natural and experimental philosophy was offered as a part of the medical curriculum. The thesis requirement was retained but made optional in Latin or English.⁵

Shortages

Early in the history of the University of Pennsylvania and other 18th century medical schools, serious functional problems arose from a shortage of textbooks and teaching materials and at times from a dearth of teachers. The faculty compensated by requiring each student to attend two complete courses of lectures, the second year being a repetition of the first, rather than two terms of graded curriculum. In this way it was believed or at least declared that students would thoroughly cover the subjects. As late as 1808 the University of Pennsylvania merely stated that the candidate for the M.D. degree must attend two winter terms (identical) and take each professor's course of lectures. This obvious pedagogic foible, at first justified as necessary, became by 1820 universal practice in American medical schools and was naively justified because it was the custom in Philadelphia.⁶

These early modifications in a soundly devised plan of medical education which resulted in a diluted scheme—including the repetition of first year lectures in the second year—began to characterize medical education in the United States. It is a somber fact that the great majority of American medical schools, rapidly increasing in numbers during these decades, followed a pattern which led to the debasement of standards for admission to the profession.

The 19th century scene

Before evaluating medical education in the United States during the first six decades of the 19th century we may well look at the American scene. For the young republic it was a time of vast geographic expansion, domestic turmoil, social upheaval and the beginning of an industrial revolution. The Louisiana Purchase (1803) and the Monroe Doctrine (1823) were unmistakable signs of national consciousness and responsibility. Watered by the well springs of personal freedom, ideologies of many hues and casts appeared to flourish in the shallow intellectual soil of a rising civilization. Some movements rooted and became a part of America; others withered but enriched the seedbed of a new culture.

Alexis de Toqueville, who visited extensively in the United States during the middle of this period was impressed with American emphasis on the practical while the exploration of the common sources of knowledge and the development of basic scholars in the sciences were grossly neglected. He attributed this exceptional outlook principally to America's Puritan origin, its exclusively commercial habits, and to the very nature of the country being occupied. Only the proximity of Europe with its cultivation of the arts and sciences, he observed, permitted such neglect in the United States, without a relapse into barbarism.⁷

There were actually some signs of relapse. By 1830 practically all states had some sort of regulations designed to protect the public and to restrict, to some extent, admission to the practice of medicine. But the groundswell of Jacksonian democracy, 1830-1850, swept away these protective acts and left the profession and public almost without definitive and pro-

protective laws in their respective commonwealths. Thus for the space of several decades, while American legislators burned incense to the rights of the "common man" the portals of medical practice were open to thousands of poorly qualified Americans, not to mention hordes of irregulars who rode the crest of succeeding waves of immigration from Europe. Not until late in the century were intelligent forces within and without the profession able to bring about a restoration of public understanding and responsibility.

Close behind the cutting edge of the American frontier followed men of ideas and special competence—merchants, artisans, lawyers, doctors, teachers, clergymen. Where the social order was elementary, industrious pioneer physicians often combined one or two callings with medicine in order to survive. Others, especially the herbalists and leeches, became roving practitioners. Medicine in some form kept up with a shifting frontier.⁸

Four cultured stages

Historian Dixon Ryan Fox once pointed out four stages are discerned in the transit of culture.⁹ As applied to the passage of the body of medical knowledge from Europe to American, these four steps are: first, when the Colonial pioneer communities received their medical succor from foreign trained practitioners who accompanied or soon joined them; second, when native youth returned to the old country for professional indoctrination in medicine; third, when schools were instituted in the new land; fourth, when there were sufficient native institutions to make the profession self-sustaining.¹⁰ Within the borders of the American scene, with its repeated waves of westward

migration, professional competence was approached in much the same order, from provincial to metropolitan status. The transit of medical education through these years of "manifest destiny," although lighted occasionally by flashes of individual brilliance, were for the most part dull decades of educational stagnation and trade school competition.

American system

The American system of medical education, a combination of apprenticeship and public lectures developed into a characteristic pattern with unique features during the early decades of the 19th century. It was an era marked by mushroom growth of medical schools. The trend continued unabated, only to be slightly checked by certain social forces and some pressure from within the profession in the decade of the '50's. Subsequently the exigencies of the Civil War closed practically all of the southern schools, weakened many northern schools through the withdrawal of southern students and the departure of some students and faculty members for military service.

No significant uniformity prevailed in the manner through which physicians associated themselves together in the capacity of a medical faculty of some university, college, or independent school. There were both apparent and hidden motives. Usually a desire to elevate the standards of the profession was declared to be the principal motive. The provincial urge to make or at least to advertise the facilities of an institution or community as equal or superior to that of its competitors, played an important role. All too often petty differences, selfishness, pride, and a lust for publicity and a larger income were guiding factors with the in-

dividual. Although many methods were employed in formulating plans for the establishment of medical schools, they group rather conveniently into five classifications with some allowance for variation.

Five classifications

The medical school conceived and developed as an integral part of a well-established collegiate institution had the best claim to legitimacy and longevity. By "integral part" is meant a medical school or department subject to general administration and to the trusteeship of a board competent to interpret the needs of medical education. The medical department of the College of Philadelphia, already noted, falls under this classification. The trustees were definitely committed to instituting the school before John Morgan delivered his famous two-session commencement address in which he advocated such an establishment.¹¹ The University of Michigan medical school, similarly founded 1849, paid its medical professors salaries. Paying of regular salaries to teachers in medical schools was all but an unknown custom in the middle of the past century.¹² This policy evidenced strong administrative ties between the regents and the medical school.

"Grafting"

A more common scheme by which teaching faculties sprang into being as departments of established institutions was by "grafting." Self-appointed and self-organized, groups of practitioners often knocked at the door of a college, asking to be grafted in as an adult medical department. Almost as often trustees replied favorably but they seldom accepted any financial responsibility. They saw

in a medical department, though it might be located in another state, an opportunity to boast of expansion and enhance the school's name. The arrangement was simple since the conventional college charter of that time authorized the giving of any and all degrees. The medical professors continued to carry on as they saw fit with their added prestige. Such faculties gave little attention to mother institutions except at the commencement season, when medical graduates sallied forth with their parchments bearing the seal of a college which they may never have seen and which had scant knowledge of its medical alumni.

When Queen's College of New Brunswick, New Jersey, in 1792 and 1793 conferred 15 medical degrees, it was through the agency of a medical faculty in New York City. Another alliance of this sort was the liaison in 1820 between Castleton Medical Academy of Castleton, Vermont, and Middlebury College in the same state. The academy had previously received a charter to grant medical degrees but the Castleton professors were meeting obstacles which they felt the new relationship would correct. By 1827 the ties were severed and Castleton continued as an independent proprietary college.¹³ Professorial feuds or quarrels between the trustees and the adopted faculties usually brought about dissolution but not always without a struggle. In 1854 the trustees of Hampden-Sidney College in southern Virginia sought through the Virginia legislature to retain control of its seceding medical department in Richmond, to which it had never contributed a dime. The professors won and were rechartered as the Virginia Medical College.¹⁴

A medical school planned and executed as one of the departments in the initial structure of the university

or college is a third classification. Perhaps the only good illustration of this type is the medical department of the University of Virginia, established in 1825. A medical faculty was incorporated in Thomas Jefferson's original plan for the institution. Although only one chair was established at first and clinical instruction was minimized for a time, the concept was sound and broadly based for that time. The trustees not only acknowledged medicine as a profession but incorporated it in the curriculum as a discipline worthy of the attention of an educated man.¹⁸

In the fourth grouping are schools sponsored by professional societies. The College of Physicians and Surgeons of New York City was established in 1807 by an enabling act of the legislature which named the newly organized Medical Society of the City and County of New York as the corporate body of the proposed school.¹⁹ A local professional society, with all its politics and professional rancor did not prove to be a suitable governing body. Somewhat less trouble and conflict were experienced by the College of Medicine of Maryland in Baltimore, founded in 1807 as a child of the Medical and Chirurgical Faculty—the state society.¹⁷ Neither institution, however, continued long under professional society control or influence.

The fifth and largest group includes the many independent medical schools, proprietary in nature, which multiplied rapidly during this period. The first of such institutions was the medical department of the University of Maryland. The faculty of the College of Medicine of Maryland, impressed by its initial success, envisioned itself as the nucleus of a university to be composed of several schools. In 1812 it secured the passage of a legislative act authorizing

it to "constitute, appoint, and annex to itself" faculties in law, divinity, and the arts and sciences. The act endowed each faculty with the power to fill vacancies in its teaching staff and made the provost and the professors of the several departments or schools the regents of the university. The professors apparently failed to sense that universities are best developed as a superstructure on the well laid foundation of a school of liberal arts and that medical schools thrive best when planned and developed as an adjunct to a sturdy central structure. The charter which they secured created a sort of mythical university, since all departments, medicine excepted, failed to materialize with any degree of permanency for some years.¹⁵ The professors and regents were one and the same body, endowed with the power of self-perpetuation. This vesting of the powers of trusteeship in the faculty was a departure from sound practice, marking the beginning of the evil days for American medical education.

The second independent school with a state charter was Castleton Medical Academy in Vermont. Several more were spawned elsewhere in New England. New York and Pennsylvania began chartering proprietary faculties during the third decade. The majority of the Southern schools exhibited similar venal weaknesses at some time.

In the decades following, the state legislatures chartered independent groups of self-appointed professors over whom there was exerted little or no restraint. Not all proprietary schools held uniformly low standards, but the pressure of competition and the absence of detached and independent governing bodies without personal pecuniary interests forced standards downward.

The Wilderness

When the west opened up, the wilderness was soon spotted with medical faculties determined to join in the race for local or provincial priority in the training of physicians for the migrating frontier. Individuals and faculties laid great emphasis on their inalienable constitutional right to freedom of action. Dr. Samuel Annan at the opening of the Kentucky School of Medicine in 1850, publicly declared.

Thought and action, within the limits prescribed by regard for the public weal, are free as the air which goeth where it lists; and it would, therefore, be no more consistent with truth and fact to assert that individuals or associations have not the right to engage in the instruction of students of medicine, than to say they have no permission to organize schools, academies, and colleges for general education.¹⁹

Wars between schools and faculty feuds over questions of establishing or moving schools resulted in some of the most bitter enmity imaginable. The public weal, as Annan labeled the general welfare, was often not a deciding factor in faculty and trustee decisions. The pressure of two or more rugged individualists on the same faculty or on neighboring faculties held the possibilities of factional strife with wholesale emotional outbursts.

The success of the Transylvania medical department in the early '30's inspired some Kentucky physicians who were not enjoying the emoluments of lecture fees to think and talk of another medical school. Charles Caldwell, Transylvania's ablest dealer in caustic repartee, delivered an address entitled: *Thoughts on the Impolicy of Multiplying Schools of Medicine*, which was published in 1834. The unnamed object

of Caldwell's diatribe was Transylvania's alumnus, James Conquest Cross, distinguished more for brilliancy than for emotional stability. There ensued a two-way abusive harangue. When news leaked out that Cross had secured permission to establish a medical department in Louisville, under the charter of Centre College of Danville, the friends of Transylvania attacked the scheme with telling vigor. In a pamphlet acknowledging defeat, Cross matched Caldwell in the art of unbridling the pen.

We have stifled the barking of their curs, but now upon our trail, we hear the deafening and petrifying cry of their unkenelled bloodhound, who is to hunt us down, and achieve our destruction. But to speak less figuratively, Dr. Caldwell, the Champion of the Transylvania Medical School, has come out in a pamphlet of between 30 and 40 pages, filled with abuse, which in malice, hatred, virulence and vindictiveness, has never been surpassed.²⁰

Dr. Caldwell and Dr. Cross achieved early distinction as educators but their vitriolic natures made them increasingly unacceptable to their colleagues. Apparently having failed to develop the arts of tolerance and unselfishness in their professional relationships, both men gravitated from the center of the stage and died in relative obscurity.

The Madison Wisconsin *Argus* announced on September 26, 1848, the forthcoming opening, in Rock Island, Illinois, of a branch of Madison Medical College of Wisconsin. Plans for a school in Madison never matured, so the branch had no trunk. Dean M. L. Knapp's rhetorical skill must have impressed the aggregation of plainsmen, who on the first day (November 7), crowded the lecture hall on the Illinois side of the Mississippi.

No honor could be more congenial

to my feeling for since enduring some 15 years of toil in the profession in Illinois, to find myself at last in this El Dorado of the flow'ry West, on the banks of a lovelier river than the "Blue Moselle," presiding as accoucheur at the birth of a new institution of Medical Learning, pure, promising, and undefiled by perfidy, comely in every feature, and limb, matchless, indeed, at her birth, is, to me, a source of more unalloyed happiness than I could enjoy were I elected to the Chief Magistracy of a State.²¹

After a term of three months, Dr. Knapp's matchless infant was moved to Davenport, Iowa, where it lived briefly under a new charter as the College of Physicians and Surgeons of the Upper Mississippi. In the spring of 1850 the peripatetic dean again packed his valise and relocated at Keokuk, Iowa, where his child was adopted as the medical department of the State University of Iowa in 1851.²²

The ephemeral nature of many medical schools, especially the country or frontier institutions, is well illustrated by La Porte University medical department, founded by a New Yorker, Daniel Meeker, who took his first course of medical lectures at the College of Physicians and Surgeons of the Western District of the State of New York, in a village named Fairfield. Continuing his trek westward Meeker paused long enough to attend a second term at Willoughby Medical College (named for one of Fairfield's favorite professors) in the Western Reserve. Settling at La Porte, Ind., Dr. Meeker began practising and training office pupils. An attorney friend who also had students joined with him in projecting a university composed of two professional schools—law and medicine. Formal instruction in medicine began in 1842.²³ There was a chamber-of-commerce tinge to an announcement in the university *Circular* for 1844-45.

A Female Seminary is about being organized and the town of Laporte promises to become the Athens, as it is now the Eden, of the Northwest.²⁴

Attendance reached a peak three years later but female pulchritude, Grecian culture, and Edenic landscape were not enough to sustain the university. It died for lack of support, in 1850, mainly because of a shortage of anatomical material and clinical facilities.²⁵

Cities watched struggle

The major cities of the United States, as well as rural communities, witnessed the struggle to advance medical education and to benefit personally by participation. Some events in Philadelphia are sufficient to illustrate. The idea of a second medical school in Philadelphia after the merging of the two schools in 1792 remained dormant for some years. After George McClellan, a Yale arts graduate, finished in medicine at the University of Pennsylvania in 1819, he made it easier for ambitious or disgruntled practitioners to began thinking of a second school. Within two years McClellan had so many private pupils he had to open a lecture room on Walnut Street. Before long the young preceptor was carrying the torch for a new school which had both zealous support and ardent opposition. The movement culminated in the establishment of Jefferson Medical College of Philadelphia under the charter of Jefferson College of Canonsburg, Pa. The new school opened in November 1825, with its 107 students having no significant effect on medical attendance (440) at the University of Pennsylvania.²⁶ The spirit of proprietary independence which characterized Jefferson from the first became very real in 1838 when legal

ties with the Canonsburg institution were severed by mutual consent and the legislature launched Jefferson on an independent existence with the same powers and restrictions as the University of Pennsylvania.

Complete independence may have precipitated the faculty quarrel which resulted in the vacating of all faculty chairs in 1839. George McClellan was not among the old faculty members re-appointed. At 43 years of age he set out with characteristic vigor to organize another medical school, the third for Philadelphia. He consummated a rather loose agreement with Pennsylvania College of Gettysburg, but with full corporate privileges as the medical department. In 1840 he secured from the Legislature a charter amendment which confirmed the right of Gettysburg to confer medical degrees in Philadelphia.²⁷ In 1840 the *Announcement* noted that the clinical facilities of Blockley and Pennsylvania Hospitals were accessible to its students. An 1849 charter change made the medical department of Pennsylvania College little short of independent. It continued to operate until 1859 when its assets were merged with another proprietary institution, Philadelphia College of Medicine which closed in 1861.

Proprietary factor

A survey of medical education in the country during this period reveals that the proprietary factor in some form and in varying degrees characterized the organic structure of practically every school. Most of the medical faculties adopted by collegiate institutions continued virtually as autonomous institutions. Rarely did the foster parent school take any financial responsibility. The lack of adequate clinical facilities and suf-

ficient anatomical material was an insoluble problem for rural faculties and for some urban schools. The realization that they were of necessity the masters of their fate bred a spirit of independence among many medical faculties, which frequently manifested itself in quarrels, dissension, and even disreputable conduct.

Costs

A student enrolling in a medical school paid a matriculation fee of three to five dollars. He then paid a lecture fee to each teacher whose course he expected to take. A printed or informal ticket of admission signed by the professor was the student's access to the course. Separate tickets were issued for practical anatomy and hospital attendance. With a set of such cards the student could go to the dean's office and enroll in the school "album" or register. The cost of tickets varied throughout the country, \$15 being the average cost per lecture ticket. Dissecting tickets were \$5 to \$10 and the hospital or clinic charge was never more than \$10. A graduation fee ranged from \$10 to \$40, but was usually \$15 or \$20. Schools required a statement certifying that the candidate had served acceptably a term of three years of apprenticeship. The apprenticeship fee which ranged from \$50 to \$100 per year was a part of the cost of medical education. If the location of the school was convenient the student could attend lectures during the course of his precepteeship. With five to six lecture fees to pay each term, plus all accessory fees including the apprenticeship, the cost of a medical education could easily mount to \$350 to \$650 and three years of elapsed time.²⁸

Although some schools attempted

to operate with no income other than student fees, funds for capital investment—of necessity—had to come from outside resources. At times sacrificial professors dedicated part or all of their fees to developing a physical plant. More often they clung to every lecture fee offered them and joined in soliciting or luring students from whatever source possible. There are many examples of legislative loans and gifts, even to privately owned institutions. Public subscription, including the gifts of prospective professors, frequently made up the initial sum for establishing a new school. Universities and colleges were very slow to recognize or to accept any financial responsibility for such capital expenditures. Even lotteries, by state authorization, were indulged in to raise money for buildings and to pay off mortgages.²⁹

Subject matter

A variety of terminology was employed in the classification of subject matter and the naming of courses. Anatomy, physiology and chemistry were regarded as the basic preclinical subjects. Modern bacteriology and pharmacology had not yet been born. Pathology was showing signs of progress before the end of the period.³⁰ Botany and natural history were also regarded as basic until late in the period, but all schools did not offer them. The principal clinical subjects were: surgery, medicine, therapeutics, materia medica, or pharmacy, and obstetrics and diseases of women and children. Medical jurisprudence was added in many schools before 1840. Two or more subjects were commonly combined in one chair, such as anatomy and surgery.

Before the 19th century American medical professors were dependent

on foreign texts. English authors and American or English translations of European writers were popularly received throughout this period but after 1800 there was a growing number of American authors of textbooks. These sources, along with writers in indigenous medical journals, exercised more and more influence in American medical education.

Every medical school had a collection of books called a library. At times the school library was little more than the assembled collections of the professors. Three hundred to 1500 volumes was average for an institutional library. The library of Pennsylvania Hospital was a valuable adjunct to medical education in Philadelphia. The decades of this period were a period of gestation for some of America's great medical school libraries.

A prime problem in all but a few city medical schools was securing an adequate supply of bodies for dissection. After the Massachusetts anatomy act of 1831 which gave unclaimed bodies to recognized medical institutions other states slowly followed suit. Legislative acts tended to improve the situation, but public sentiment still made grave robbing an apparent necessity in some quarters for many years.

Attendance

Of 33 schools reporting to the newly organized American Medical Association in 1849, only eight reported hospital attendance as obligatory. Twelve reported that no such requirement was made. The remaining 13 were significantly silent. The schools of Philadelphia, New York, Boston, Baltimore and other cities, which had access to relatively good hospitals and clinics, in their an-

nouncements laid great emphasis on their wealth of clinical facilities. It is known that the ward walk, the conventional method of clinical instruction, during the lecture terms was frequently so crowded that only a few students close to the clinician benefited materially from the excursion through the hospitals and clinics. According to the historical evidence available to this author the New Orleans School of Medicine was the first to institute a teaching method akin to the clinical clerkship. In 1857 this school began assigning each student to an individual patient. The student then did a complete history and physical which was recorded and reported. The plan included regular conferences between student and teacher, which were conducted in a constructively critical manner. Students followed their cases carefully until patients recovered or died. Whenever possible, autopsies were secured and performed after the teacher and student discussed the anticipated findings.³¹ Clinical instruction was a major problem of nearly all medical schools of this time and a serious concern of the committee on medical education of the American Medical Association after its organization in the late '40's.

Women students

The movement to open the medical profession to women achieved a measure of success before the Civil War. Elizabeth Blackwell enrolled at Geneva Medical College in the fall of 1847 and graduated with honors in 1849. By 1865, four medical schools for women had been established and several other established schools had permitted the enrollment of women. Two of the women's schools were devoted to sectarian medicine. Certain liberals supported medical education

for women because they believed in equal rights for the sexes. Curiously, some conservatives found themselves in the same camp because they believed that male physicians should not care for women.

Sectarianism

Sectarianism in medical education during this period is a story in itself. The schools of the "isms" were ephemeral and soon passed away, with the exception of the eclectic and homeopathic colleges, a few of which maintained themselves into the 20th century. The irregular schools existing before the Civil War were devoted largely to medical sectarianism and contributed to the continuation of low standards of medical education.

The glaring defects in the system of medical education in the United States were long noted by competent and intelligent educators and practitioners.³² As early as 1827 delegates from medical societies in New York and the New England states met in Northampton, Massachusetts, and passed a remarkable set of resolutions designed to elevate the standards of medical education, but no school had the moral courage to embark on the recommended program.³³ The Northampton plan came to naught as did many other well planned suggestions during succeeding decades. The agitation for reform nevertheless gradually grew and expanded, and became a major factor in the founding of the American Medical Association in 1847. A survey of the *Transactions* of the Association from 1847 to 1861 reveals some isolated efforts to elevate the standards of medical education but no nationwide movement was implemented by all the sincere and meaningful resolutions passed at national

conventions. With no administrative authority over the practice of medicine and medical education, and with few state regulatory acts to invoke, the American Medical Association did well in its first fourteen years to check the downward trend, by pointing the profession and its educational institutions in the direction of reform.³⁴

No American medical schools in this period were comparable to the best foreign schools. But not all the medical schools of the young republic were short lived or afflicted with the flagrant weaknesses of the prevailing pattern. In spite of many hindrances several university medical departments enjoyed consistent patronage at home and respect abroad. Among the better schools of the country when the Civil War disrupted the routine of American life were the University of Pennsylvania School of Medicine, Jefferson Medical College, College of Physicians and Surgeons of Columbia University, University of the City of New York Medical Department, Chicago Medical College (later a school of Northwestern University) and New Orleans School of Medicine.

The profession, in spite of many weaknesses, produced during this period some brilliant educators, men whose names live on in the annals of medical education—John Morgan,

William Shippen, David Hosack, the Warrens, Daniel Drake, Nathan Smith. Other competent teachers and a multitude of lesser known medical educators spawned a breed of practitioners not unlike themselves, who, in a time of intense nationalism and migrating frontiers, succored a race of men who were dedicated to defense of the rights of the individual and of man's quest for wealth.

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1. The vital statistics of medical education during the colonial and early national period are principally the product of careful research by Frederick C. Waite, "Medical Degrees Conferred in the American Colonies and in the United States in the Eighteenth Century," *Annals of Medical History*, 9:314-20, July 1937. The one William and Mary honorary M.D. degree was conferred on John F. Coste, first physician of the French Army operating in the Virginia area. See *The History of the William and Mary College . . . 1693-1870*, 1870, p. 145; Frederick C. Waite, "The Age of Harvard Medical School in Relation to that of Other Existing Medical Schools in the United States," *New England Journal of Medicine*, 216, 10: 418-25, March 11, 1937, p. 418.

2. See Waite "Medical Degrees Conferred . . .", *supra*, pp. 317-19 for individual tables on each school and composite tables for the 18th century.

3. Whitfield, J. Bell: "Medical Students and Their Examiners in Eighteenth Century America," *Transactions and Studies of the College of Physicians of Philadelphia*, 4 Ser., 21, 1:14-24. Bell

TABLE II
Estimates of the Number of Medical Students and
Medical School Graduates at Intervals

Year	Medical School Attendance	Medical School Graduates
1810	650*	100*
1840	2,500*	800*
1860	5,000*	1,700**

*Estimates by N.S. Davis, *Contributions to the History of Medical Education and Medical Institutions*, 1877.

**Gross estimates by the author.

quotes Dr. Samuel Johnson as having told a young American, Arthur Lee of Virginia, that Oxford and Cambridge did not permit students to enter physic until seven years of literary study had qualified them for the M.A. degree. On the European influence see also William Frederick Norwood, *Medical Education in the United States Before the Civil War*, 1944, p. 27.

4. Joseph Carson: *A History of the Medical Department of the University of Pennsylvania*, 1869, pp. 77-85.

5. *Ibid.*, pp. 93f., N. S. Davis, *op.cit.*, p. 54, comments on this early event in the decline of medical education standards in the United States.

6. Henry Burnell Shafer: *The American Medical Profession, 1783-1850*, 1936, p. 35. Shafer cites "Minutes of the Medical Faculty," University of Pennsylvania 1767-1814 (manuscript in 4 volumes) p. 102.

7. Alexis de Toqueville: *Democracy in America*, 1845, Vol. II pp. 36-38. See also Henry Steele Commager, *The American Mind*, 1950, Chapter one.

8. For a few examples see George H. Weaver: "Beginnings of Medical Education in and Near Chicago," *Bull. Soc. of Med. Hist.*, 3: 339-470, September 1925, p. 342.

9. Dixon Ryan Fox: "Civilization in Transit," *American Historical Review*, XXXII, (1927), 754-55.

10. It is refreshing to note that in the case of dentistry, the profession in America antedated their European colleagues by shedding the traditions of charlatanism and establishing indigenous techniques superior to that of European countries. The first American dental school (Baltimore College of Dental Surgery, 1840) was established 19 years before the first European school (English) which dated from 1859. Thus the transit of culture was reversed. See Richard H. Shryock, *The Development of Modern Medicine*, 1947, pp. 338-39.

11. John Morgan: *A Discourse Upon the Institutional of Medical Schools in America*, 1765.

12. Norwood, *op. cit.*, pp. 350-52. In the paying of salaries Michigan was antedated by the University of Virginia which, in 1825, imported Robley Dunglison, a young Englishman who had been editor of the *London Medical Repository*, to fill a general chair of medicine at an annual salary of \$1,000 with a guarantee of additional emoluments of

\$500. A full medical faculty developed as a result of this beginning.

13. Frederick C. Waite: *The First Medical College in Vermont, Castleton 1818-1862*, 1949, pp. 49-78.

14. Wyndham B. Blanton: *Medicine in Virginia in the Nineteenth Century*, 1933, pp. 42-50.

15. Blanton, *op.cit.*, pp. 19ff; Herbert M. Adams, "Thomas Jefferson and the University of Virginia," *United States Bureau of Education Circular* . . . No. 1, 1888, pp. 86-98.

16. David Hosack: *Observations on the Establishment of the College of Physician and Surgeons in the City of New York*, 1811, pp. 2ff.

17. Eugene Fauntleroy Cordell: *University of Maryland, 1807-1907*, pp. 6-15; Eugene Fauntleroy Cordell, *The Medical Annals of Maryland, 1799-1899*, pp. 54-59.

18. *Ibid.*, pp. 36-43. The act of 1812 was eventually declared unconstitutional by reason of contravening the rights and privileges of the charter of 1807.

19. Samuel Annan: *An Introductory Lecture Delivered at the Opening of the Kentucky School of Medicine*, 1850, p. 3.

20. James Conquest Cross: *Thoughts on the Policy of Establishing a School of Medicine in Louisville, Together with a Sketch of the Present Condition and Future Prospects of the Medical Department of Transylvania University*, 1834, p. 5.

21. M. L. Knapp: *An Address Delivered at the Opening of the Rock Island Medical School*, 1848, p. 5.

22. The original intention of Knapp and his colleague, George W. Richards, (both had recently withdrawn from Laporte Medical College in Indiana) was to open a school in Illinois. When they ran into legal difficulties they turned to the callow Wisconsin legislature which authorized the Madison Medical College, "with power to create a branch of the same." Their Madison associates apparently expected the school to be in or near Madison, with authority to create a branch. The "branch" provision actually became a betrayal of the original intent. See Norwood, *op. cit.*, pp. 347-50.

23. Gen. W. H. Kemper, *A Medical History of the State of Indiana*, 1911, pp. 48-56.

24. *Annual Circular and Catalogue of*

LaPorte University, 1844-45, p. 3.

25. There was an unsuccessful attempt to revive LaPorte University in 1852. See Helen B. Clapesattle, *The Doctors Mayo*, 1941, p. 30.

26. Friends of the University became increasingly apprehensive in 1825-26 when Jefferson's agreement with the Canonsburg institution was altered to provide a local board in Philadelphia. The university trustees memorialized the legislature and were successful in blocking Jefferson's right to confer medical degrees in Philadelphia. Dr. McClellan made a marathon drive with horse and sulky to Harrisburg and returned with an unhampered charter before the first graduation on April 8, 1826.

27. The second section of the act secured by McClellan declared that "hereafter it shall not be lawful for any college incorporated by the laws of the State, to establish any Faculty for the purpose of conferring degrees, either in Medicine or the Arts, in any City or County of the Commonwealth, other than that in which said college is or may be located." See Samuel Gring Hefelbower, *The History of Gettysburg College*, 1932.

28. For further information on the cost of medical education see Norwood, *op. cit.*, pp. 392ff.

29. *Ibid.*, pp. 387-91.

30. The introduction of the microscope as a practical aid to medical science came late in this period but not soon enough to greatly influence the teaching of pathology or to establish bacteriology on a rational basis.

31. Albert E. Fossier: "History of Medical Education in New Orleans from Its Birth to the Civil War," *Annals of Medical History*, 6:432-35, September 1934.

32. Even medical students came in for a share of the criticism leveled at medical education. See Daniel Drake, *Strictures on Some of the Defects and Infirmities of Intellectual and Moral Character, in Students of Medicine . . .*, 1847, 16 pp.; David Hosack: *An Introductory Lecture on Medical Education . . .*, 1801, 48 pp.

33. *Proceedings of a Convention of Medical Delegates Held at Northampton in the State of Massachusetts*, 1827, pp. 3-10; cited by Shafer, *op. cit.*, pp. 91-92.

34. The American Medical Association, from its inception, had advocated

better preprofessional education, longer lecture terms (13-16 weeks was conventional), more extensive clinical instruction, and more rigid examinations. By 1860 few schools had terms of less than 18 weeks and a few were as long as five or six months. The decline of country schools and the increase in the number of city schools meant that more students were receiving better anatomical and clinical instruction. Americans continued to go to Europe for basic advanced medical education and observation. This practice provided a small but steady stream of new blood for the profession. London and Paris were popular places of study in the first half of the 19th century. Nevertheless, large numbers of young men were still entering practice with apprentice training only or with the precepteeship and less than two terms of lectures, and hence degreeless. See N. S. Davis, "Address of N. S. Davis," *Transactions of the American Medical Association*, 16:71-85, 1866.

La Educación Médica en Norteamérica desde la Guerra de Independencia hasta la Guerra Civil

Antes de la Guerra de Independencia, ya había en las Colonias norteamericanas ciertos movimientos que indicaban un desarrollo de la Educación Médica. Aunque ésta consistía, principalmente, en un aprendizaje con algún médico o cirujano practicante, en unas cuantas Universidades se daban conferencias médicas, particularmente en el campo de la Anatomía y Obstetricia. A fines del siglo XVIII, 32 *Colleges* estaban autorizados, por decreto real o acto legislativo, a conceder el título de M.D., aunque solo 10 de éstos impartían instrucción médica antes de 1801. La incipiente Educación Médica universitaria, durante ese período, se hallaba bajo la influencia de la Educación Médica del "Viejo Mundo", especialmente la inglesa y escocesa. Pero las muchas dificultades con que las recién fundadas Escuelas, cuyo número, creció rápidamente, tuvieron que enfrentarse en las primeras décadas del siglo XIX, causaron un descenso peligroso en el nivel de la instrucción y en los requisitos para la admisión a la profesión médica. Alexis de Tocqueville, que visitó los Estados Unidos en esa época, destaca el énfasis que se ponía en los aspectos prácticos de la Educación Médica, mientras que la explica-

ción y el desarrollo de los conocimientos científicos se descuidaban considerablemente. Tocqueville atribuye esa tendencia al origen del país eminentemente puritano, y a los hábitos comerciales y la expansión geográfica de la joven República. El autor del presente trabajo, profesor de "Cultural Medicine" del *College of Medical Evangelists*, en California, describe detalladamente los cambios que tuvieron lugar

en la Educación Médica durante la primera mitad del siglo XIX, trazando, al mismo tiempo, el curso que siguió la expansión geográfica, económica e industrial del país hasta la época de la Guerra Civil.

* * *

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

"Graduates and Physician Requirements"

According to an item in the *The Bulletin of the Academy of Medicine of Cleveland*, the current ratio of 113 physicians for each 100,000 persons has been maintained recently only through the increase of foreign-trained physicians. The number added to the profession in 1955 represented the equivalent of approximately 10 U. S. medical schools.

Editorials and Comments

New England Board of Higher Education Recommends

THE NEW ENGLAND Board of Higher Education consists of three members from each of the five New England states which have joined the Compact approved by Congress in 1954.

The purpose of the Board "is to improve educational opportunities in higher education, both public and private, for the youth of New England through the establishment and maintenance of a coordinated educational program." Its first attention has been given to the problems of medical and dental education and its recommendations¹ in this field are of real interest and importance to medical educators nation-wide.

This report points out: that while 4.6 students per 100,000 population enter the first year of medicine in the country as a whole each year the comparable figure for Connecticut is 4.4; for New Hampshire 4.1; for Rhode Island 3.9; and for Maine 2.4. (only Vermont, of all the New England states, enters more students in the first year of medicine per 100,000 population than does the country as a whole); that our country's population is growing so fast that to maintain the present ratio between the total population and the number of freshman openings in medical schools there needs to be established somewhere in the country the equivalent of one new medical school, larger than any one now existing in New England—each and every year; that of the eight states contributing no public money to the support of medical education, five are in New England (Massachusetts, Connecticut, New Hampshire, Rhode Island and Maine); that "unless more facilities soon become available, many qualified New England young people will be denied the opportunity of a medical education at a time when their services are most urgently needed."

The plan which the NEBHE suggests involves (1) paying each existing New England medical school \$2,500 for each student it enrolls from each New England state in excess of the number enrolled from that state on October 15, 1956; (2) each state appropriating \$2,500 for each student from that state enrolled at each existing New England medical school in excess of the number enrolled on October 15, 1956.

This report again highlights the possibilities that are inherent in regional planning on the part of states that naturally fall into a regional grouping. Through such a grouping it may well be possible to provide medical schools, dental schools, veterinary schools and other professional schools in areas which up to the present time have not been able to afford them.

Another possibility which might receive careful consideration by states without hospital facilities adequate for a four-year medical school, is the possibility of establishing a two-year school of basic science. Many of our four-year medical schools have clinical facilities much in excess of what they need for their presently enrolled third year class and could probably accommodate 300 to 400 additional third year students provided

they could be sure of their first two years' preparation. The clinical correlations of the first two years, which are stressed so much in our best four-year medical schools, would be hard to attain in a two-year basic science school apart from a hospital, and there are those who feel that these correlations are so important that no more isolated two-year schools should be established. The more common belief is, however, that the urgency of providing more places in medicine is such as to justify the establishment of a limited number of two-year basic science schools, it being assumed, of course, that special efforts would be made in the new schools to provide the clinical correlations, just as our present two-year schools provide them. D.F.S.

1. "Regional Cooperation in Medical and Dental Education for New England," New England Board of Higher Education. 31 Church St., Winchester, Mass. February 14, 1957.

Life-In-Death

"THERE is a new way of dying today. It is the slow passage via modern medicine. . . . If you are going to die it can prevent you from so doing for a very long time." So begins a poignant article in the *Atlantic Monthly* in January, 1957, and the venerable periodical, itself used by many a physician from the time of the little autocrat, observes that the large metropolitan hospitals have "made dying . . . an ordeal which has somehow deprived death of its dignity."

This is an article that cannot be summarized. It should be required reading for physicians, and perhaps it is as important that the graduate of 1957 contemplate the issues involved as it is for him to ponder on the oath of Hippocrates itself. For the essay treats of issues that Hippocrates knew nothing about; they are strictly modern. Today's graduate falls heir—and with no extra effort—to the immaculate, modern aseptic skills that can keep a diseased, half-dead, cancerous body alive, by intravenous nourishment and with the magic of penicillin and round-the-clock special nursing, so long that the doctor may emerge in the eyes of kin with little resemblance to the wise and understanding family physician of yesteryear. In the picture known to most physicians the kindly, bearded humanitarian sits quietly by the bedside waiting for his little patient to die or to recover: the decision is not his. There is hidden ignorance and sentimentality in the picture, but there is paradoxically great mental strength, beauty and spiritual dignity implicit in the situation portrayed. Much of this is denied today to members of the healing profession; and paradoxically, again, this decrease in dignity and rapport with the bereaved seems in inverse proportion to the efficacy of the medical sciences to prolong life. Perhaps there is no alternative, for certainly euthanasia is repugnant to every ideal of medical tradition. On the other side of the coin, however, is an approaching specter that looks almost as ghoulish and quite as menacing as euthanasia itself. Physicians have glimpsed this apparition for some years.

In "A Way of Dying" a widow tells not only of having glimpsed the apparition but also of having come to grips with it face to face and almost in battle for "the right to die," as one clergyman has called it, of her beloved:

We cannot inquire from the dead what they have felt about this deterrent. As they fight for spiritual release, and are constantly dragged back by modern medicine to try again, does their agony augment? To those who stand and watch, this seems like a ghastly imposition against God's will be done. Apparently there is no mercy which the family may bestow at such a time.

There is indeed today at times a new way of dying; the passage may be slowed to the point where Coleridge's disturbing stanza becomes the definition of a reality; and the ghastly reality poses a scientific as well as a metaphysical question: "What is Life and what is Life-in-Death?"

Her lips were red, her looks were free
Her locks were yellow gold
Her skin was white as leprosy
The Night-mare Life-in-Death was She
Who thicks man's blood with cold.

Reprinted with permission from The New England Journal of Medicine, April 18, 1957.

American Board of Surgery Resolution

*This resolution was passed at a special meeting,
September 24, 1956.*

THE internship is the most important year in the development of a doctor. His philosophy, methods of study, attitudes towards patients and his ability to continue his self-education are all determined to a major extent during this formative year. Therefore, the internship must be regarded primarily for its educational opportunities and not simply as a year of apprentice practice.

The best learning environment for this internship may take many forms. The areas of clinical medicine covered are of far less importance than the quality of the learning environment and the stimulus of the teachers.

The content of this year is best determined by the resources of the hospital and by the needs of the interns. In some environments this is best met by straight services and in others by mixed or rotating programs. The types of services offered in university hospitals should be determined by the faculty after careful consideration of the educational needs of the students and no attempt should be made to narrow the choice of the students by insisting on a standardization of the contents of the internship. Under no circumstances should the internship in university hospitals be abolished. The entire internship and residency training system in American hospitals as it exists to-day was conceived and developed in university hospitals by the faculties of the various medical schools.

Any attempt by other agencies to limit this important function of medical school faculties or to dictate the type of postgraduate training offered in university hospitals would be a backward step which would have serious consequences on the future of American medicine.

American College of Physicians Resolution

An action taken by the Board of Regents in April 1957

RESOLVED that the American College of Physicians supports the opinion that sound educational standards shall be the only criteria for approval of internships; that the type of internship (rotating or straight) shall be a decision locally of the individual institution; and that it be left solely to the individual institution without attempt to standardization or regimentation by any group.

BORDEN AWARD NOMINATIONS

Dr. Oliver H. Lowry, chairman of the Committee on the Borden Award, announces that nominations for the Borden Award in the Medical Sciences for 1957 are now open.

This Award was established by the Borden Company Foundation, Inc. in 1947 and consists of \$1,000 in cash and a gold medal to be granted in recognition of outstanding clinical or laboratory research by a member of the faculty of a medical school which is a member of the Association of American Medical Colleges.

Regulations Governing the Award:

1. Nominations may be made by any member of the faculty of a medical school which is a member of the Association of American Medical Colleges.
2. The Award in any year will be made for research which has been published during the preceding five calendar years.
3. No person may receive more than one Borden Award for the same research, although he may receive a later Award for a different research project.
4. If two or more persons who have collaborated in a project are selected for an Award, the gold medal and check shall be presented to the group, and bronze replicas of the medal presented to each of the collaborators.
5. The Association may refrain from making an Award in any year in which no person reports research of the quality deserving an Award.
6. Only one Award shall be made during any one year.
7. A nominee who fails to receive the Award may be nominated for the Award for the same work in a subsequent year.
8. Materials supporting a nomination should include:
 - (a) Five copies of a statement covering the academic history and scientific accomplishments of the nominee.
 - (b) Five copies of a reasoned statement of the basis for the nomination.
 - (c) Five copies of reprints reporting the nominee's important researches.
9. All materials supporting a nomination must be in the hands of D. F. Smiley, M.D., Secretary, 2530 Ridge Avenue, Evanston, Illinois, by August 1, 1957.

NEWS DIGEST

1957 Teaching Institute

The Committee on Educational Research and Services has announced that the next in the series of annual Teaching Institutes will be an Institute on The Ecology of the Medical Student, to be held October 15-19, 1957, at Chalfonte-Haddon Hall in Atlantic City, N. J. Dr. Robert J. Glaser, dean of the University of Colorado School of Medicine, is serving as chairman, and invitations have been issued to one participant from each of the affiliated and member medical schools in the United States, Canada and Puerto Rico.

The 1957 Institute represents the second in a series of two Institutes on Evaluation of the Student. Last year the focus was on appraisal of the applicant to medical school. At Atlantic City, discussion will center around the student after his matriculation in medical school—his "ecology" in its broadest sense to include all aspects of the relationship between the professional student and his academic, personal and social environment in the school.

As with past Institutes, a few special invitations have been issued. A featured speaker this year is Dr. John R. Ellis, Sub-Dean of the London Hospital Medical College, who will bring to the Institute the British point of view regarding the medical student as a person within the social and intellectual climate of the school. Two other guests are representatives of the foundations whose generous support make the Institute possible—Dr. Lester J. Evans of the Commonwealth Fund and Dr. J. Franklin Yeager of the National Heart Fund.

Announcements will appear in the *Journal* as pre-Institute planning

proceeds. The members of the Planning Committee which is responsible for launching the Institute include, in addition to Dr. Glaser:

Hugh Chaplin Jr., M.D., assistant professor, department of medicine and preventive medicine, Washington University School of Medicine

John A. D. Cooper, M.D., Ph.D., assistant dean, Northwestern University Medical School

Daniel H. Funkenstein, M.D., clinical associate in psychiatry, Harvard Medical School

Thomas Hale Ham, M.D., professor of medicine, Western Reserve University School of Medicine

George G. Reader, M.D., associate professor of medicine, Cornell University Medical College

George P. Berry, M.D., dean, Harvard Medical School; chairman, AAMC Committee on Educational Research and Services

Thomas H. Hunter, M.D., dean, University of Virginia School of Medicine; chairman, AAMC Subcommittee on Evaluation and Measurement

Helen Hofer Gee, Ph.D., director of research, Association of American Medical Colleges

Mrs. Frances Halsey, administrative assistant to Dr. Gee in the Association's central office research section, is performing the task of handling the mechanics involved in preparation for the Institute.

Characteristically, the Institute precedes the Annual Meeting of the Association, whose first session features reports on highlights of the Institute. Dr. Ellis will speak also to this gathering, where he joins other guest speakers: the Honorable Marion B. Folsom, Secretary of Health, Education, and Welfare; Roy E. Larsen, President, Time, Inc.; and Dr. O. C. Carmichael, Consultant to the Fund for the Advancement of Education of The Ford Foundation.

The first Institute, in 1953, covered The Teaching of Physiology, Biochemistry, and Pharmacology. It was followed in successive years by The Teaching of Pathology, Microbiology, Immunology, and Genetics; The Teaching of Anatomy and Anthropology in Medical Education; and the Appraisal of Applicants to Medical Schools. Thus, the 1957 Institute, the Ecology of the Medical Student, is the fifth annual Teaching Institute in the AAMC series.

N. Y. State to Build Mental Hospital

A hospital "architecturally designed to provide the latest advances in the treatment of the mentally ill" is to be built by the Department of Mental Hygiene of the State of New York at a cost of \$70 million on 125 acres of reclaimed marshland along the Hutchinson River Parkway in the Bronx. It is the first new mental hospital to be built by the state in 25 years and will accommodate 3,000 patients.

Its location, adjacent to the Albert Einstein Medical Center, will provide

the basis for a mutually beneficial arrangement whereby the two institutions will cooperate. Arrangements with the Albert Einstein College of Medicine will provide college resources for psychiatric teaching material and will bring to the hospital the consultant services offered by the school's specialists.

90% Drop in Fatal Contagions

Since 1900, there has been a 90 per cent drop in the death rate from communicable diseases, according to a report by the Health Information Foundation, quoted in *Scope Weekly*, May 15, 1957.

Fifty-six years ago pneumonia, influenza, tuberculosis, diarrhea and enteritis caused one-third of all deaths. Now, they cause less than one-twentieth.

A marked decline in the number of orphans was revealed in the report. Thirty-five years ago, 16 per cent of 18-year old children had lost one or both parents. In 1955, the number was below 5 per cent.

College Briefs

Boston

After 43 years of teaching at Boston University, Dr. Brenton R. Lutz, retiring former head of the department of biology, was honored at a recognition dinner on May 21. Dr. Lutz will leave the faculty in June.

Chicago Medical

Dr. HYMAN J. ZIMMERMAN has been appointed full-time professor and chairman of the department of medicine, effective August 1. Dr. Zimmerman is presently associate professor of medicine at the University of Illinois Medical School.

Duke

Dr. D. T. SMITH, James B. Duke

Professor of Bacteriology, is the recipient of the Trudeau Medal awarded by the National Tuberculosis Association for outstanding research and leadership. He was selected as "the person who has made the most outstanding contribution in tuberculosis work in the United States." Dr. Smith is chairman of the department of microbiology and the department of preventive medicine and public health.

Georgetown

Dr. FRANCIS M. FORSTER, professor of neurology and dean of the school of medicine, assumed the presidency of the American Academy of Neurology on April 25, at its annual meeting in Boston. Dr. Forster was

one of the Founding Fellows of the American Academy of Neurology.

Maryland

Dr. HARLAN I. FIRMINGER, professor of pathology and oncology at the University of Kansas Medical Center, has been appointed professor and chairman of the department of pathology. Dr. JOHN A. WAGNER, associate professor, was promoted to professor of neuropathology.

N.Y. Med. Coll.

The Board of Trustees has announced that on June 30, Dr. J. A. W. Hetrick will retire as president of the New York Medical College, Flower and Fifth Avenue Hospitals. He has been associated with the institution for more than 40 years.

After July 1, Dr. Ralph E. Snyder, as dean, will be the chief administrative and executive officer of the college and hospital. E. Ross Winckler will continue as administrator of the hospital.

Oregon

At its 13th annual congress held in Chicago recently, the American College of Allergists named Dr. MERLE W. MOORE, associate clinical professor of medicine and head of the division of allergy, its president-elect.

The Oregon Heart Association has donated a chair of cardiovascular research to the medical school. Under the terms of the grant, the Association will pay a portion of the salary of the man selected to fill the position and will contribute a sum annually for other expenses including technical assistance, equipment, supplies and travel to scientific meetings.

Pittsburgh

Dr. LESTER J. EVANS, executive associate of the Commonwealth Fund, was the main speaker at the Medicine Seminar . . . one of 17 seminars which were held in conjunction with the inauguration ceremonies of Dr. Edward H. Litchfield as the 12th chancellor of the university on May 9-11.

Discussants for the medical seminar included Dr. LOWELL T. COGGESHALL, dean of the division of biological sciences, University of Chicago and president-elect of the Association of American Medical Colleges; Dr. VERNON W. LIPPARD, dean of the school of medicine, Yale University; and Dr. WARD DARLEY, Executive Director of the Association.

JOHN C. BUGHER, director for Medical Education and Public Health, Rockefeller Foundation and ABEL WOLMAN, professor of sanitary engineering, school of hygiene and public health, Johns Hopkins University, were the main speakers at the Seminar on Public Health.

Seton Hall

Dr. DESMOND D. BONNYCASTLE has been appointed professor and director of the department of pharmacology. Dr. Bonnycastle was formerly associate professor of pharmacology at Yale University.

Dr. HUGH G. GRADY has been appointed professor and director of pathology, effective June 1. Dr. Grady has been professor of pathology (part-time) at Howard University Medical School since 1954.

Stanford

The school of medicine will present a postgraduate conference in medicine from June 13-15. Registration is unlimited and will be open to M.D.'s.

The conference will offer lectures and panel discussions presenting the practical solutions of common problems in cardiovascular disease, endocrinology, infection and hematology. Diagnosis and treatment will be emphasized throughout. Further information may be obtained from the Office of the Dean, 2398 Sacramento Street, San Francisco.

S.U.N.Y. (Brooklyn)

Dr. BRIAN MACMAHON has been promoted to professor of environmental medicine and community health, thus creating a second full professorship in this department of

which Dr. Duncan W. Clark has been chairman since 1951.

Dr. OWEN N. WANGENSTEEN, professor and chairman of the department of surgery at University of Minnesota, is presently visiting professor of surgery. Dr. WANGENSTEEN is a former editor of *Surgery*.

George Washington

Dr. JOHN PARKS has been appointed dean, succeeding Dr. WALTER A. BLOEDORN, who will retire at the end of the academic year. Dr. Parks joined the faculty in 1939 and is now professor of obstetrics and gynecology.

Wayne

Approximately 700 physicians from across the nation attended the College of Medicine's two-day clinical program and alumni reunion on April 30 and May 1. This was the 71st annual "Clinic Days" program designed by the alumni association to help physicians keep abreast of the progress being made in medical science.

Wisconsin

Fifty foreign scholars will attend a conference on medical education to

be held at the University June 24-26. The medical school faculty and about 20 guest speakers from medical schools throughout the country will discuss the philosophy and practice of American medical education and lead discussion sessions to answer the visitors' questions.

Six national agencies are sponsoring the conference, the first of its kind. They are: the China Medical Board, the Rockefeller Foundation, the Kellogg Foundation, the Fulbright Committee, the United States Department of Health, Education and Welfare, and the Association of American Medical Colleges.

The three-day lecture will be divided into lecture, discussion and recreation periods.

Yale

Doctors from all parts of the country and five foreign countries met at the university in May for a course on surgery of the nose. The course, which ran for one week, was aimed at teaching doctors the latest developments in rhinology. The Yale School of Medicine and the Grace-New Haven Community Hospital sponsored the course in cooperation with the American Rhinologic Society.

MISSISSIPPI

The first physicians to complete their medical schooling within Mississippi since 1910 will receive their M.D. degrees in a commencement ceremony to be held by the school of medicine on Sunday, June 16.

Dr. David S. Pankatz, dean of the four-year school of medicine and director of the center, has announced that the school will have 24 candidates for the M.D. degree and four candidates for the B.S. degree in nursing at its first commencement. Dr. Guy A. Caldwell of New Orleans, a member of the AMA Council on Medical Education and Hospitals, will deliver the graduation address.

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Book Reviews

Clinical Examinations in Neurology

Members of the Sections of Neurology and Section of Physiology, Mayo Clinic and Mayo Foundation for Medical Education and Research, W. B. Saunders Co., Philadelphia, 1956, 370 pages.

This review of the practical aspects of neurologic diagnosis is confined largely to methods but includes appropriate comments upon the underlying rationale. It embodies the accumulated experience of a large clinic over nearly 40 years of instruction and practice, now summarized by 16 members of the present staff.

The customary principles of history-taking are outlined, emphasis is placed on the use of record forms, and detailed descriptions are made of the standard techniques of evaluation of the mental status and motor and sensory functions. Less conventional and particularly useful sections are those concisely describing the diagnostic uses of the electroencephalogram and the electromyogram. The final sections quickly scan biochemical and pharmacological aids and the examination of cerebrospinal fluid. The chapter on language functions includes an ingenious chart for aphasia testing and samples of the Mayo Clinic neurologic history and examination record forms are enclosed in a jacket inside the back cover.

The presentations are clear, forceful and highly factual. The authors offer practical hints to the unwary or the novice, largely avoiding theoretical or disputed issues. As a friendly guide to the methods of neurology, this volume serves well its stated purpose.

E. Charles Kunkle, *Duke*

Internal Medicine

A Physiologic and Clinical Approach to Disease. Robert F. McCombs, B.S., M.D., F.A.C.P. (pp. 685, \$10.) The Year Book Publishers Inc., Chicago, 1956.

This new textbook of internal medicine is very readable and contains a great deal of useful information. It is obviously based on the author's own sound clinical experience and he has had the assistance of colleagues from the New England Center Hospital. As the title suggests the physiological approach is stressed and appropriate methods of investigation for each system are given in some detail, perhaps rather to

the disadvantage of the clinical features, treatment and prognosis. Sections such as those on renal disease and renal failure, body fluids and electrolytes and disorders of the blood and blood-forming organs are all excellent. There is no section on neurology.

In the chapter on pulmonary diseases, lung function studies are given prominence but there is no mention of broncho-pulmonary anatomy, nor of hemoptysis. Although pulmonary tuberculosis is expertly summarized—a difficult task—carcinoma of the lung receives scant attention and is inadequately discussed on half a page.

The physiologic approach to cardiovascular disease does not lead to as much clarity as might be expected. There is no distinction between left and right sided cardiac failure, peripheral and central cyanosis, and systolic or diastolic hypertension. The section devoted to valvular defects and congenital heart disease is too brief and contains several misstatements, such as syncope in aortic stenosis is due to heart block (rather than due to low cardiac output) and tricuspid insufficiency is usually associated with tricuspid stenosis (rather than being functional, due to dilation of the ring).

References are given at the end of each chapter to appropriate recent articles from American literature. There are remarkably few misprints. For a book as compact as this, it has excellent features and all criticism is given in the hope that it may be constructive for future editions.

G. W. Scott, *Johns Hopkins*

Advances in Pediatrics

Vol. IX, S. Z. Levine, editor. Year Book Publishers, Inc., 1957.

This is the ninth successive volume in this series of annual reviews. No attempt has been made in this series to present comprehensive coverage of all advances in pediatrics during the year, but rather to provide timely and scholarly summaries of existing knowledge in certain areas of interest within the general field.

Dr. Levine and his competent board of associate editors have selected this year a group of seven topics currently of particular importance. Again, as in



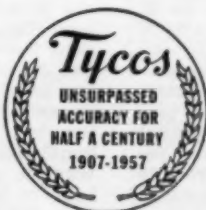
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previous volumes, the subject matter is clearly and authoritatively presented by authors who obviously know what they are writing about. The subject of "postmaturity" is ably reviewed and discussed by Dr. Stewart H. Clifford, who is largely responsible for calling attention to this antithesis of prematurity and for emphasizing its importance in consideration of the newborn. Present knowledge concerning gamma globulin is summarized by Dr. Charles Janeway and Dr. David Gitlin, whose basic research and clinical applications have contributed so much to the understanding of this subject. Familial Dysautonomia, an important clinical syndrome only recently recognized, is ably discussed by Dr. Conrad Riley. The confusing and complex problems related to coagulation disorders in infancy are elucidated in a review of this area by Dr. Irving Schulman and Dr. Carl H. Smith. In addition, this volume contains a review of thyroid disorders in childhood by Dr. William A. Reilly; use of fluoride compounds in prevention of dental caries by Dr. Edward R. Schlesinger and Dr. David B. Ast; and Celiac disease by Dr. H. A. Weijers, Dr. J. H. Van De Kamer and Dr. W. K. Dicke.

Edward C. Curnen, *North Carolina*

An Atlas of Anatomy

J. C. Bollean Grant, M.C., M.B., Ch.B., F.R.C.S. (Edinburgh), Professor of Anatomy in the University of Toronto.

As this excellent and well-known atlas has been revised and improved, it has become more and more complete and consequently more valuable as an atlas. In this fourth edition, the inclusion of more than eighty new illustrations and an improvement of many of the old illustrations has done much to perfect an atlas, which was already very good. However, there are some parts of the body that are still not illustrated, in particular, the central nervous system. The blood vessels of the central nervous system, the meninges, and the ventricles are, therefore, not adequately treated. It is true that in most medical schools these structures are treated in special neuro-anatomy courses. For the sake of completeness, however, it is hoped that future editions of this atlas will include these important structures.

The chief merit of the atlas is its simplicity and the fact that the labels are not so numerous as to be confusing. The illustrations are, for the most part, simple and realistic in appearance, but there are also some diagrams that have

great teaching value. The text is concise and easy for students to follow. The numerous, colored illustrations greatly enhance the atlas, and the method of color printing that is used keeps the price within a range that is attractive to students. This atlas will not need to be recommended to medical students because they will discover it and use it entirely on their own. It will be particularly good for beginning students in anatomy.

Frank J. Figge, *Maryland*

Examination of the Nervous System

A. Theodore Steegman, M.D. *The Year Book Publishers, Inc., 1956. 164 pp. with index.*

This little book is intended to guide the student through a neurological examination, and in this purpose it succeeds very well. It is more than the usual brief outline in that practical procedures are covered in adequate detail with some discussion of necessary physiologic background. It is not a textbook, intentionally omitting formal descriptions of disease, abstruse eponyms and tests not needed by the beginner. Good use is made of outline drawings and tables. The photographs of patients are rendered unusually effective by the technique of cutting out backgrounds so that essential features appear in relief against the white page. A larger number of such illustrations would have been welcome.

A few points might have been elaborated further. The statement that Hoffmann's sign "is not pathognomonic of pyramidal tract disease" seems likely to confuse the student, if it is not explained. The descriptions of myotonia and myasthenia are inadequate. They leave the incorrect impression that the same tests will demonstrate the respective defects in all cases, and that therapy is always dramatically successful. Presumably a chart of cutaneous sensation is necessary, and the use of the female figure is a pleasant innovation. Why the dermatomes vary so much from book to book should be explained for the student, particularly when the author's maps diverge from most in the girdle regions. Finally hazardous procedures such as the use of a pinhead to test corneal sensation, and the production of syncope by carotid sinus pressure to demonstrate carotid arteriosclerosis, certainly do not belong in this guide.

The format is intended to fit the student's pocket, the price his wallet. A

little shaving in all dimensions would probably be appreciated.

Leonard W. Jarcho, Utah

**Diseases of the Heart and Circulation.
(2nd Edition)**

Paul Wood. J. B. Lippincott Co., Philadelphia 1956. 1095 pp with illustrations. \$

A comprehensive textbook, in which the material is clearly and accurately presented, with generally excellent illustrations and diagrams. The bibliographic material, which follows each chapter, is extensive and up to date. A particularly impressive feature is the constant correlation of clinical features, pathological physiology and the findings obtained from more specialized techniques such as phonocardiography, cardiac catheterization, angiocardiography, etc. The sections on congenital heart disease and chronic rheumatic heart disease are especially noteworthy in this regard.

There are few areas in which there is room for criticism. One is the very brief discussion of digitalis toxicity, in which the only therapeutic suggestions are cessation of the drug and if necessary, the use of atropine.

The volume is heartily recommended as a useful addition to the library of all physicians interested in the diseases of

the heart and circulation.

E. Harvey Estes, Duke

Sequeira's Diseases of the Skin

John T. Ingram and Reginald T. Brain. The MacMillan Co., New York. 843 pp with illustrations.

The 6th edition of this standard text, first published in 1911, is the first revision in ten years. Large sections of the book have been rewritten and brought up to date. The plan of the book is similar to that of previous editions. The book is written for medical students and practitioners and the emphasis is on short, practical but remarkably complete descriptions with a minimum of references.

The illustrations (63 colored plates and 426 Text Figures) are excellent.

Appendix III is particularly valuable for those unfamiliar with the use of Roentgen therapy in dermatology.

Some of the therapeutic agents recommended would be unfamiliar to the American student or physician. This is perhaps the chief weakness of the book from an American viewpoint. This, however, is not a serious drawback and the book would be a satisfactory, handy, practical volume for students and practitioners.

Sidney Olansky, Duke

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Personnel Available

• **PHYSIOLOGIST-PHARMACOLOGIST, Ph.D., 34.** Five years medical school teaching experience, married, 4 children, veteran, Protestant, 13 publications, societies, research interest in Intermediary Metabolism, present rank of assistant professor. Desires academic appointment. Address: A-267.

• **INTERNIST-FULL TIME CLINICAL TEACHER:** 32, family; Exper: many phases teaching program with medical school, also private and county hospital. Special training in rheumatology, psychiatry and research. Leaving military service in June 1957. Desire opportunity to develop and direct medical education in private hospital, or continue prev. academic career. Address: A-268.

• **ZOOLOGIST:** Ph.D., 1934. General Biology, General Zoology, Embryology, Physiology, Oncology. Desires teaching and research position in basic science school or medical school for 1957. Address: Department of Biology, Brown University, Providence 12, Rhode Island.

• **MICROBIOLOGIST, Ph.D.,** strong background in bacterial physiology, biochemistry, and medical bacteriology; interested in academic or full-time research post. Address: A-270.

• **CHEMIST-PHYSIOLOGIST:** Ph.D. in Org. Chemistry, recent M.S. in Physiology. Extensive experience in industrial pharmaceutical research. Publications. Patents. Desire position in medical research in academic institution. Address: A-271.

• **SURGEON:** Several years of cancer surgery. Original clinical research work. Societies. Publications. Languages. Board eligible. Presently holding senior staff position. Desired is preferably a full-time position allowing clinical activities and clinical research. Address: A-272.

• **DIPLOMATE AMERICAN BOARD OF SURGERY-F.A.C.S.** pending, age 32. Additional 1½ years training in cardiovascular surgery and research. Teaching experience at under-graduate and post-graduate levels in cardiovascular and general surgery. Publications. Desires research and teaching position. Available immediately. Address: A-273.

• **PHARMACOLOGIST:** M.D., Ph.D. (in pharmacology); 3 years teaching in a medical school and 7 years pharmacological research experience. Desires teaching and/or research position. Address: A-274.

• **ANATOMIST:** M.D., Ph.D. Presently Associate Professor but desires change of locale. Teaching experience in microscopic anatomy; research is histo and cytochemistry. Publications. Desires teaching-research or full time research position in medical center in upper mid-west or far west. Address: A-276.

• **JUNE 1957 Ph.D. in Biochemistry and Nutrition.** Research interest in cardio-vascular disease, specifically the amino acid composition of serum lipoproteins from normal and atherosclerotic patients. Teaching experience. Seeks full-time position. Address: A-277.

• **PHYSICIAN (Specialty Pulmonary Dis).** Pharmacologist, Physiology-M.D. 1943, D.Sc. 1954 (Dept. Physiol. and Pharmacol). 3 yrs. Fellow and Instructor Dept. Physiol. and Pharmacol; 3 yrs. Asst. prof. in charge of section on pharmacology, dept. physiol. and pharmacol. and in charge of pulmonary function lab. of polio center associated with medical school. Active research all six years. Position: Teaching, Research, Clinical or Pharmacology. Available summer or fall, 1957. Address: A-278.

• **PHYSICIAN-BIOCHEMIST:** Training in internal medicine, engaged for past seven years in research in experimental diabetes and studies of insulin action. Now completing work for degree of Ph.D. in biochemistry. Desires appointment in department of biochemistry, physiology, medicine, or research medicine. Available January, 1958 at completion of present fellowship. Address: A-279.

• **OBSTETRICIAN GYNCOLOGIST:** Aged 34, 8 years specialty training, Member of Royal College of Obstetricians and Gynecologists, wishes to emigrate to U.S. At present civilian consultant to U.S. Air Force in U.K. Interested in academic post where state licensure not immediately required. Four publications. Address: A-280.

• **INTERNIST, BOARD ELIGIBLE:** charity and university internship and residencies—D.N.B. —married—desires career academic position on medical school faculty—any phase of teaching, administration, research or admitting room supervision. Address: A-281.

• **PHYSIOLOGIST:** Ph.D., male, 35, married. Desires opportunity for research with or without teaching. Six years research experience in circulatory physiology. Teaching experience in medical and graduate physiology. Available September, 1957. Address: A-282.

• **PHYSIOLOGIST-ENDOCRINOLOGIST:** Mature, male, Chicago Ph.D. Wide teaching, research, and research directing experience in Human, General, Endocrine, and Behavioral Physiology. Publications. Societies. Desires graduate or medical teaching position with ample time and facilities for research. Will attend Federation meetings. Address: A-283.

• **MICROBIOLOGIST:** M.S., University; Ph.D., Medical Sciences, Summer, 1957; 30, male, married. Three years teaching assistant in medical school course in microbiology. Four years research experience. Graduate studies include basic science course, except pharmacology, in first two years of medical school. Desires academic position with opportunity for research. Address: A-284.

• **MEDICAL LIBRARIAN:** M.A., M.S., male, 38, married. Now completing third year as head of library serving medical and dental schools and affiliated hospitals. Have reorganized procedures, hired and trained a staff to do the library's work. Now seek more responsible post in larger library. Address: A-285.

• **MICROBIOLOGIST:** Ph.D. background in medical microbiology, bacterial physiology, biochemistry, cytology, and drug effects. Four years' academic and industrial research experience. Desires teaching and/or research. Address: A-286.

• **PHYSIOLOGIST:** Ph.D. Currently teaching and research in college of veterinary medicine (5 years); past experience in zoology-physiology in liberal arts college (5 years); radiobiological experience — summer 1956; publications; desire academic or responsible research position. West or midwest preferred, but other locations considered. Present rank, assistant professor. Address: A-287.

• **MICROBIOLOGIST:** Ph.D., age 35, seven years medical school teaching experience. Desires teaching and research position. Main interests are in nutrition, metabolism, genetics, and the mode of action of chemotherapeutic agents. Address: A-288.

• **INTERNIST:** Age 40, certified by the American Board in Internal Medicine 1950. Rank, assistant professor of medicine in eastern medical school. Interested in metabolism and renal disease, but has broad training including most sub-specialties. Written and has had published about 30 manuscripts. Desirous of heading own section and instituting some organized clinical investigation, as well as clinical teaching. Address: A-289.

• **SURGEON:** An experienced British surgeon wishes a senior academic post. Undergraduate multi-prizeman and scholar in medical subjects. Qualifications: M.B., B.S. Honors. Durham, 1939; F.R.C.S. Edinburgh 1942. M.S. Durham, 1944; F.I.C.S. 1956. Experience: War service, surgical specialist, Royal Air Force. A senior general surgeon with senior academic career. Many practical research papers published. Address: A-290.

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Suggestions for Supplementing the Medical Curriculum in Time of National Emergency (Joint Committee on Medical Education).

Hospitals Participating in the Matching Program 1957 (NIMP publication).

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